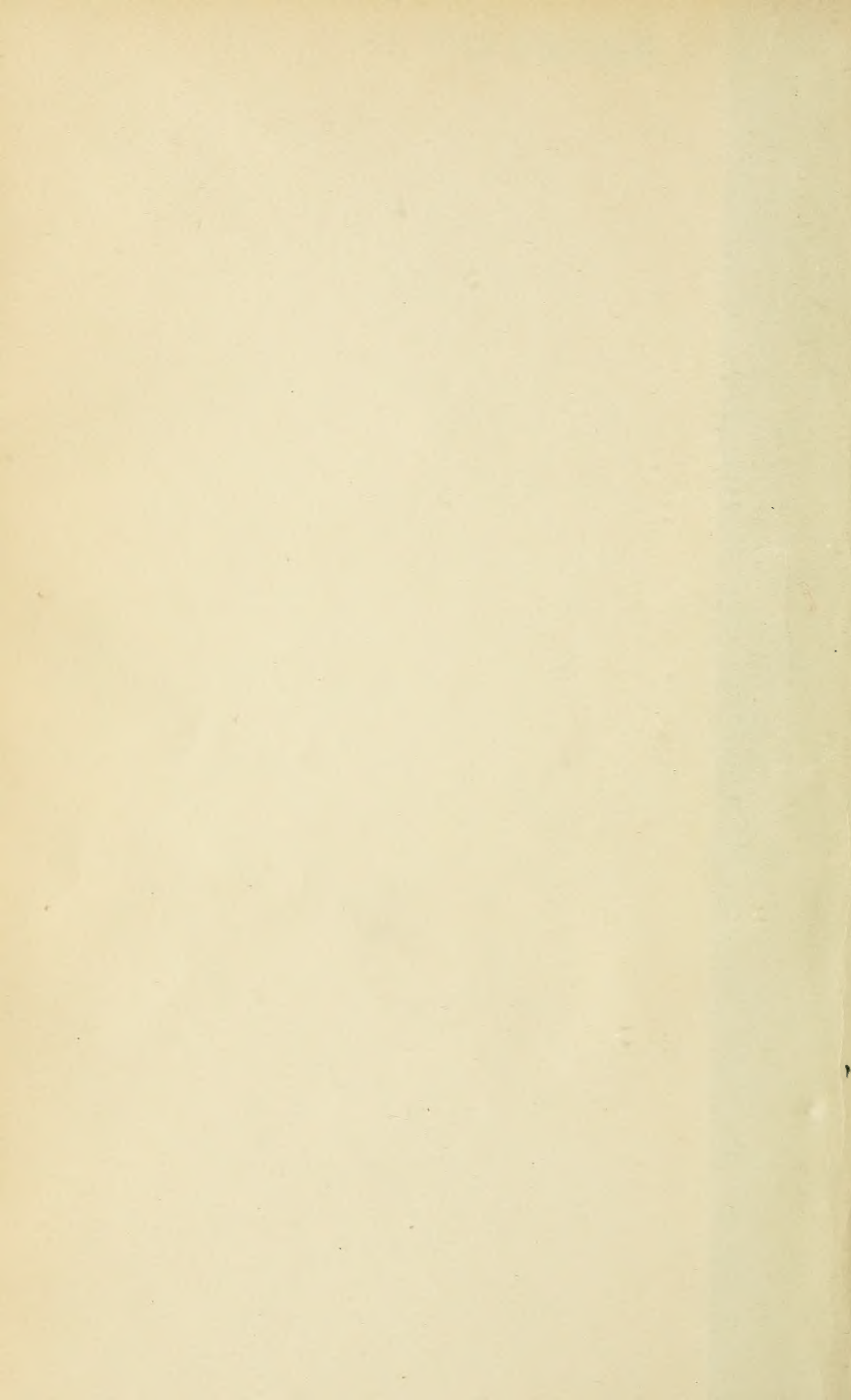


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THE
INSTITUTE OF CHEMISTRY
OF
GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.

1920.

PART I.

176239
24/11/22

No register issued in 1920

Issued under the supervision of the Proceedings Committee.

RICHARD B. PILCHER.

Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.
February, 1920.



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R725
1920

Proceedings Committee, 1919-20.

OSCAR L. BRADY (*Chairman*),
SIR HERBERT JACKSON (*President*),
WILLIAM BACON,
CECIL H. CRIBB,
ALEXANDER C. CUMMING, O.B.E.,
J. T. DUNN,
H. G. LACELL,
J. H. LESTER,
ANDREW MORE,
G. H. PERRY, M.B.E.,
HARRY SILVESTER,
GEORGE STUBBS, O.B.E.

Editorial.

BEGINNING with this part the official publication of the Institute will be known as the *Journal and Proceedings*, and it will be published in six parts yearly.

A step towards the extension of the Proceedings was made during 1919 by the inclusion of articles on matters of professional interest. The Council hope to render the publication of still greater utility to the Fellows and Associates by its extension on the lines indicated in their Report for 1919—1920 (p. 14).

The policy of the Institute is to encourage the highest standard of training on the part of those who intend to be chemists, to test that training, to register the competent, and to maintain the integrity, the status and welfare of the profession.

Every endeavour will be made by means of the journal to promote the greater realisation of the value of Fellowship and Associateship, of co-operation and mutual esteem, by keeping the commonweal of the profession as much as possible in the minds of the members. Without trenching on the ground covered by journals devoted to their science, the main object of the development of the official organ of the Institute will be to encourage chemists to take a lively interest in their profession.

REPORT OF THE COUNCIL

(1919—1920.)

To be submitted to the Fellows and Associates of the Institute at the Forty-second Annual General Meeting, to be held on Monday, March 1st, 1920.

The Council have pleasure in submitting their Report on the progress of the Institute during the twelve months ending January 31st, 1920, a period of marked activity in many departments of its work and in the general development of its policy.

I. THE ROLL OF THE INSTITUTE.

During the period covered by this Report 105 new Fellows (of whom 35 were Associates) have been elected and 3 Fellows have been re-elected; 482 new Associates (of whom 50 were Registered Students) have been elected and 1 Associate has been re-elected. The name of 1 Associate who had been inadvertently reported deceased has been restored to the Register. 218 new Students have been admitted.

The Council regret to record the death of 23 Fellows, 6 Associates, and 6 Students.

FELLOWS.

William Beam, M.A., M.D.
John Richard Brooke.
Adrian John Brown, M.Sc., F.R.S.
Percy Watson Copeland, B.Sc.
William James Cousins.
Sir William Crookes, O.M., F.R.S.
Philip Anderson Estcourt.
Thomas Fairley.
Harold Cecil Greenwood, O.B.E.,
D.Sc.
Sidney Harvey.
David Basil Hewitt, B.A., L.R.C.S.
Henry Owen Huskisson.
Andrew King.
John Falconer King.
Frank Bernard Last.
Francis Edward Lott, A.R.S.M.
Robert Sydney Marsden, D.Sc.,
M.B.
Lieut.-Col. Edward Nicholson,
M.R.C.S.
Sir Boverton Redwood, Bart., D.Sc.

Norman Scott Rudolf, M.Sc.
Harry Shulman, B.Sc.
Francis Godfrey Tarn.
George William Alvey Teanby.

ASSOCIATES.

Thomas Pearson Kilner Crosland.
Owen Charles Edwards, B.Sc.
Glyn Jones, B.Sc.
John Frederick Hall, B.Sc., A.R.C.S.
Frederick William Dyson Marshall,
M.A., M.Sc.
Lieut. Lawton Keir Rodger, R.E.

STUDENTS.

Lieut. Stephen Hepworth Dennett,
R.A.F., B.Sc.
Lieut. Reginald Greaves, R.G.A.
Douglas Rayment Keller, B.Sc.
Lieut. Ferribee Sadler, R.F.C.
Lieut. Guy Somerville Stewart,
R.F.C.
2nd Lieut. Joshua Biram Crossley
Wigfield, R.E.

Of the above, the following died in the service of their country during the war :—

LIEUT. STEPHEN HEPWORTH DENNETT.

LIEUT. REGINALD GREAVES.

GLYN JONES.

LIEUT. LAWTON KEIR RODGER.

LIEUT. FERRIBEE SADLER.

LIEUT. GUY SOMERVILLE STEWART.

2ND LIEUT. JOSHUA BIRAM CROSSLEY WIGFIELD.

The resignations of 8 Fellows, 5 Associates and 12 Students have been tendered and accepted, and the names of 18 Fellows, 7 Associates and 21 Students have been removed for non-compliance with the bye-laws.

At the date of this Report (January 31st, 1920), the Register of the Institute contained the names of 1,548 Fellows, 1,413 Associates and 469 Students. The number of Members has been increased by 497, and of Students, by 120.

The Council believe that, during the past few years, as the Institute has steadily gained in numbers, it has gained in prestige, in influence and in usefulness to the profession of chemistry.

2. THE WORK OF THE COUNCIL.

The Council have held 11 Meetings, and there have been held, in addition, 102 Meetings of Committees, Boards and Sub-Committees.

The following is a list of Committees and of their respective Chairmen :—

COMMITTEE.						CHAIRMAN.
Finance	...	...	...	...	...	The Hon. Treasurer.
General Purposes	...	...	...	...	...	The President.
Glass Research	...	...	...	...	...	Sir George Beilby, Past-President.
House	...	...	...	...	...	George Stubbs.
Institutions	...	...	...	...	...	Gilbert T. Morgan.
Lectures	...	...	...	...	...	The President.
Library	...	...	...	...	...	Alexander Findlay.
Nominations and Examinations	...	...	...	...	...	The President.
Proceedings	...	...	...	...	...	Oscar L. Brady.
Public Appointments	...	...	...	...	...	A Chaston Chapman.
Services (Jointly with representatives of the Institute of Metals)	...	...	...	...	...	The President.
Standards	...	...	...	...	...	J. T. Dunn.

The President has been appointed a Member of the Treasury Committee for the selection of Temporary Assistants in the Government Laboratory.

The President and Sir James Dobbie have represented the Institute on the Conjoint Board of Scientific Societies, and the President on the Federal Council for Pure and Applied Chemistry.

Mr. Horatio Ballantyne has represented the Institute at the Conferences of Scientific and Technical Institutions on the Patents and Designs Bill (Proceedings, Part IV. 1919, pp. 3—4).

Mr. F. W. Harbord and Dr. J. J. Fox have been appointed representatives of the Institute on the Aircraft Sub-Committee on Chemicals of the British Engineering Standards Association.

The Registrar of the Institute has continued to act as a Member of the Resettlement of Officers Committee of the Appointments Department of the Ministry of Labour; he has also served as a Member of the Grants Committee of the same Department.

3. FINANCE.

The Financial Statements for 1919 are attached to this Report (pp. 20—24).

GENERAL ACCOUNT.—The Fellows and Associates will find evidence in the statements submitted which fully justifies the Hon. Treasurer and the Finance Committee in recommending the increase in the Annual Subscriptions which was notified towards the close of 1918. The Council are gratified, moreover, with the general concurrence of the Members in that decision without which the development of the work of the Institute would have been seriously impeded. The change in economic conditions arising from the war has affected institutions no less than individuals, and notwithstanding the increase in the Membership of the Institute, the Council have not been able to keep the expenditure within the available income. They have found it necessary to increase the Staff

of the Institute and to provide additional office equipment to cope with increasing work. As the Hon. Treasurer showed at the Annual General Meeting held on March 3rd, 1919, the Institute had prior to and during the war expended practically the whole of its income in the pursuance of its objects. The reserve capital had received scarcely any addition (beyond Life Compositions which have been duly invested) for over twenty-five years, and the Council, with the consent of a General Meeting, had been obliged to apply a considerable proportion of that capital, temporarily, at least, to supplement the Building Fund. The adverse effect of the war on the financial position of the Institute was mitigated to some extent by the fact that the premises were in use by Government Departments, who contributed a due proportion of the expense of maintenance. That contribution, however, ceased early in 1919, and, although the use of laboratories has been allowed to a few members from time to time during the year, the receipts under that head were only a small fraction of those which in previous years had accrued to the Institute under the far more extensive use made of the premises by the Government.

While a considerable proportion of the increased expenditure is due to matters which will not recur when the affairs of the Institute are more settled, the main increase arises from the membership having doubled during the past few years. Apart from the rise in the cost of printing the expenses under this head have been substantially increased by the greater circulation of the publications of the Institute, by the publication of the Register after an interval of five years, with consequent very heavy corrections and additions, and by the preparation of proofs of the new Bye-laws and Regulations. Correspondence is far heavier than in the past, and the item for postage therefore much higher. The sum of £601 4s. 4d. for rates and taxes includes £153 14s. 0d. paid on the account for 1918, and £6 11s. 0d. paid for 1920; so that the actual amount for 1919 was £440 19s. 4d. "Repairs and furnishing" includes £56 18s. 0d. spent on office equipment, including an

addressograph, a new typewriter, filing cabinets, etc. Advertisements have cost rather more than in pre-war times, and it will be remembered that additional publicity has been given to the Appointments Register. The accounts for gas, light and power are to some extent heavier than they would have been, due to the occupation of the premises of the Institute by Government authorities during the first quarter of 1919. The expenditure which may be regarded as abnormal may be estimated at more than £400.

The bulk of the Life Compositions paid during the year was invested as received, and the amount outstanding has since been placed to Capital Account.

In the coming year, additional expenses will be incurred, legal advice, printing, etc., in connection with the revision of the bye-laws; but with the exercise of due economy, the Council hope that when the re-organisation of the affairs of the Institute is completed they will be able to keep the expenditure within the income and to complete the investment of all Entrance Fees as well as of Life Compositions.

BUILDING FUND.—The Contributions to the Building Fund received during the year amounted to £280 18s. 2d. Of this, a sum of £150 has been repaid to the General Account, which, however, has since borne expenditure on further equipment and fittings costing £280 13s. 7d. At the close of the year the Building Fund was still in debt, including interest, to the General Account to the extent of £2,027 1s. 0d. During the month of January, 1920, further contributions have been received amounting to £407 11s. 0d. The Council have now decided to close the Fund on March 1st, and to charge the deficit to the General Account.

BENEVOLENT FUND.—The Council have long felt the need for the provision of a Benevolent Fund in connection with the Institute and intended to establish such a Fund when the Building Account was settled. The London and South-Eastern Counties Section have lately pressed the matter and have submitted a draft scheme for consideration. The matter will be taken in hand during the coming session.

4. GENERAL PURPOSES COMMITTEE.

The work of the General Purposes Committee, as of the other Committees, has been reported upon from time to time in the Proceedings. The General Purposes Committee has held 14 Meetings. The Rules for Local Sections have been formulated and, with some small modifications, adopted. The Committee has also been concerned with the question of the relation of the Institute to the Industrial Councils. The bearing of chemistry on industry has been discussed with officials of the Ministry of Labour, and the Institute has offered to co-operate with the Ministry and with the Industrial Councils in the furtherance of the practical applications of science.

The Council of the Institute are aware that the Joint Industrial Councils are, for the present, largely occupied with the consideration of economic conditions, but they have urged that the employment of scientific men and the furtherance of scientific methods are essential to the satisfactory solution of many problems of production. They have suggested, therefore, that it would be advantageous that representative chemists should be co-opted when required, or otherwise associated with the Industrial Councils, since they believe that, although the number of chemists engaged in any particular industry may be small, their special knowledge and experience should enable them to render such valuable service in the interests of all concerned as to warrant such co-option, even though they may not be actual members of the Industrial Councils.

The Council have made this suggestion impartially in the interests of industrial development, the encouragement of the study of processes, and the furtherance of research. At the same time they have stated that they will be prepared to nominate suitable representatives, and will be glad to assist, so far as they are able, in the elucidation of problems relating to chemistry or chemists which may be referred to them.

The Committee has undertaken the revision of the Bye-

Laws, a task of no little difficulty, since it involves the reconciliation of the views of the various Local Sections and of the Honorary Corresponding Secretaries, from whom many valuable suggestions have been received and duly acknowledged. The Committee hopes that the Revised Bye-Laws will be ready for submission to an Extraordinary General Meeting of the Institute at an early date in 1920.

The General Purposes Committee has considered and reported on the returns received with regard to the pay and conditions attached to whole-time chemical appointments (see pp. 31—41). The Committee has also reported to the Council on the question of chemists practising under business names other than their own (p. 27).

5. GLASS RESEARCH COMMITTEE.

Although the balance of the grants received (for glass research) from the Department of Scientific and Industrial Research has been returned, the Glass Research Committee has continued its meetings, and has reported on various matters relating to laboratory apparatus. It is still in touch with the Department, and has recently been consulted with regard to the present supplies, the quality and the price of British chemical glassware (see pp. 25—27).

6. HOUSE COMMITTEE.

The premises of the Institute have been thoroughly redecorated and the Committee has put in hand part of the equipment which had been postponed owing to the war. The laboratories have ceased to be occupied by any Government Department ; but accommodation has been provided, from time to time, for a few chemists engaged in research work.

7. INSTITUTIONS COMMITTEE.

The Council have, on the recommendation of this Committee, added two Institutions to the list of those formally recognised for the training of candidates for the examinations

of the Institute: the Huddersfield Technical College and the Sir John Cass Technical Institute. The latter provides a satisfactory evening course extending over six years, specially intended for students who are engaged in chemical work during the day. The consideration of several applications has been deferred pending the reorganisation and development of the chemical departments of the Institutions concerned.

8. LECTURES.

The resumption of the Lectures Scheme has been unavoidably delayed from various causes; but arrangements are being made for two Lectures on Flotation Processes, to be given by Mr. H. L. Sulman, F.I.C., during the month of March, 1920. These Lectures will be based on a paper which has recently been read before the Institution of Mining and Metallurgy. The Paper will be reprinted for inclusion in the Institute's series of Lectures, and will be issued to the Fellows, Associates and Students before the Lectures are delivered. The Council tender their thanks to the Institution for their concurrence in this arrangement.

9. THE LIBRARY.

Considerable additions have been made to the Library during the year, and the Council have had the pleasure of acknowledging many gifts of books from authors and publishers.

THE LIBRARY OF THE CHEMICAL SOCIETY.

Under arrangements made with the Chemical Society, the Fellows and Associates of the Institute have the privilege of the use of the Library of that Society. This privilege is further enhanced by the extension of the hours during which the Library is open, viz.: Monday to Friday, from 10 a.m. to 9 p.m.; Saturday, from 10 a.m. to 5 p.m. The scope of the Library of the Society is being specially developed on the side of technological literature.

The Council of the Institute record their appreciation of

the valuable facilities thus afforded, of which many Members have availed themselves.

10. NOMINATIONS AND EXAMINATIONS COMMITTEE.

The work of the Nominations and Examinations Committee has been no less heavy than it was during the previous year.

The Committee has held 37 Meetings, and, in order to cope with the applications which had accumulated early in the year, worked throughout the summer vacation.

The applications received and considered are scheduled below, with a record of the decisions arrived at :—

Applications for Admission to Studentship :

Accepted	...	...	...	...	...	...	...	218
Declined	...	...	...	...	...	...	...	2
Total	...	...	...	...	...	...	...	220

Applications for Election to Associateship :

*Accepted	...	...	...	...	...	...	...	482
Referred for Examination	...	...	...	...	...	...	...	146
Declined	...	...	...	...	...	...	...	143
Postponed for compliance with the Regulations	...	...	...	...	...	...	...	11
Total	...	...	...	...	...	...	...	782

* By examination : 9.

Applications from Associates for Election to Fellowship :

Accepted	35
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Applications for Election to Fellowship :

*Accepted	73
Referred for Examination	38
Declined	...	...	...	...	...	...	...	71
Postponed	...	...	...	...	...	...	...	2
Total	...	...	...	...	...	...	...	184

* Re-elections : 3; by thesis : 4; by examination : 2.

Applications for Examination for A.I.C. :

Accepted	...	...	...	...	...	...	...	11
Declined	...	...	...	...	...	...	...	3
Total	...	...	...	...	...	...	...	14

Applications for Examination for F.I.C. :

Accepted	...	...	...	...	...	...	...	2
Declined	...	...	...	...	...	...	...	1
Total	...	...	...	...	...	...	...	<hr/>3 <hr/>

(Total number of applications: 1238.)

In 152 cases the Candidates for Associateship and Fellowship have been invited to be interviewed by the Committee or by one of the Local Committees appointed by the Council after conference with the Local Sections. The thanks of the Council are accorded to the local interviewing Committees for their services and reports.

REGULATIONS.—The Committee has also taken in hand the revision of the Regulations on lines determined by a Joint Meeting of the General Purposes Committee, the Board of Examiners, the Chemical Technology Examinations Board, and the Nominations and Examinations Committee. The Council hope to publish the new scheme in March.

The main scheme, stated briefly, will require a minimum of four years' systematic training at a recognised university or other institution, followed by an examination for the Associateship conducted by the Institute in general (theoretical and practical) chemistry ; or admission to the Associateship, in the case of graduates with first or second class Honours in Chemistry or equivalent degrees or diplomas obtained after a four years' course. It also provides for the admission to the Fellowship of Associates of three years' standing, either on passing an examination in a special branch, or on producing evidence of original research of sufficient merit, or, in special circumstances, on satisfying the Council that they have otherwise materially contributed to the advancement of chemical knowledge (Proceedings, Part III., 1919, pp. 23—24).

EXAMINATIONS.—Reports have been received and transmitted to the Council on Examinations held in July and October, 1919, and January, 1920.

The results are summarised in the following table :—

				EXAMINED.	PASSED.
Associateship Examination :					
Branch (a)	Mineral Chemistry	...	...	2	1
Branch (d)	Organic Chemistry	...	...	6	5
Branch (e)	Chemistry of Food and Drugs, etc.	...	...	3	2
Branch (f)	Biological Chemistry	...	...	1	0
Branch (g)	Chemical Technology	...	...	2	1
Fellowship Examination :					
Branch (b)	Metallurgical Chemistry	...	...	1	1
Branch (e)	Chemistry of Food and Drugs, etc.	...	...	1	1
				16	11

The thanks of the Council have been accorded to the Governors of the Lister Institute, Royal Technical College (Glasgow), and to Dr. Dyer, for the use of Laboratories for Examination purposes.

II. PROCEEDINGS COMMITTEE.

The Proceedings have been published in Four Parts during 1919, and have contained, in addition to reports on the work of the Council and Committees, special articles on "The Institute and the Economic Interests of Chemists" in Part II. ; "Chemists and the Whitley Councils," "The Ministry of Health and Scottish Board of Health," "The Fellowship of the Institute" and "The Constitution of the Institute," in Part III. ; and "The Appointments Register," "Ex-Service Chemists," "Professional Institutions" and "Scientific and Industrial Research" in Part IV.

The official publication of the Institute will be styled in future "The Journal and Proceedings," and will be issued in six parts per annum, which will be paged consecutively and provided with an index. It will contain—in addition to the Proceedings of the Council and of Local Sections, reports of examinations, and other matter hitherto included in the Proceedings—notes and articles on current topics of professional interest, reports of meetings and conferences, reports of law cases of special interest to chemists, comments on Government orders and regulations, notices of books and their contents. Fellows and Associates are invited to forward

suggestions with regard to matters coming within the programme outlined above.

12. PUBLIC APPOINTMENTS COMMITTEE.

The Public Appointments Committee has given careful attention to matters affecting professional interests, and the Council, on its advice, have from time to time taken such action as they considered desirable. Representations have been made to the various Government Departments in which chemists are engaged, urging the more complete organisation of the Government Chemical Service on clearly defined lines. The Council will take steps to keep their views before the authorities concerned in order that their recommendations may not pass unnoticed.

Jointly with representatives of the Society of Public Analysts, the Public Appointments Committee has carefully watched the progress of matters relating to the Ministry of Health, and the Council have had the pleasure and satisfaction to report that the new Ministry has so far recognised the claims of chemistry by the appointment of Sir William Tilden, Past-President, as a Member of the Council (of the Ministry) on Medical and Allied Services, while two other Fellows of the Institute—Dr. Eustace Hill and Dr. F. Gowland Hopkins—are Members of the same Council. The Institute and the Society of Public Analysts also supported the Association of Public Analysts of Scotland in an endeavour to secure similar representation for chemistry on the Scottish Board of Health. Although up to the present such representation has not been secured, there is reason to believe that the Secretary for Scotland will not be unmindful of the importance of chemistry in matters affecting the public health.

A further circular urging Local Authorities concerned with the Sale of Food and Drugs Acts and Fertilisers and Feeding Stuffs Act to reconsider the terms of appointment of Public Analysts and Official Agricultural Analysts, has been issued over the signatures of the Presidents of the Institute and of the

Society of Public Analysts. It is hoped that this will have more effect than the circular issued in January, 1919: for, although some authorities have revised the terms of appointment, the majority appear not to have given due consideration to the matter in view of the present economic conditions.

13. REAGENTS COMMITTEE.

REAGENTS AND FINE CHEMICALS.—The Reagents Committee, consisting of representatives of the Institute and of the Society of Public Analysts, has been in communication with manufacturers of chemical reagents and with Professors and teachers in Universities, Colleges, and Schools on the question of the desirability of publishing a further edition of the "List of Reagents for Analytical Purposes," published in 1915. Reference to this proposal was made in Proceedings, Part IV., 1919, when Fellows and Associates were invited to send in suggestions with regard to the revision and extension of the List. The List was produced during the early months of the war, when several manufacturers turned their attention to products which have been known under the term "A.R.," in order to secure for chemists a satisfactory and adequate supply of such materials.

The Reagents Committee is also interested in the question of supplies of fine chemicals, which are at present inadequate, both as to quantity and variety, although the Council understand that this matter is receiving the attention of the Federal Council for Pure and Applied Chemistry and of the British Association of Chemical Manufacturers.

14. (JOINT) SERVICES COMMITTEE.

A Committee consisting of representatives of the Institute of Chemistry and the Institute of Metals has under consideration the question of the status and organisation of chemists and metallurgists in the Navy, Army and Air Force. The Councils of both Institutes have received preliminary reports from the Joint Committee.

15. STANDARDS COMMITTEE.

The Committee appointed to consider the advisability of providing for the preparation and distribution of standard samples of chemical substances, ores, etc., convened a conference of representatives of bodies interested in the matter and reported to the Council in July. The report, which was published in Part III. of the Proceedings, 1919, has been referred to the Society of Public Analysts with a suggestion that the allied bodies should be represented on any Committee which may be appointed to deal with the matter.

16. LOCAL SECTIONS.

The Council congratulate the Local Sections on their successful establishment and record their thanks for suggestions and assistance received from them during the year. Fellows and Associates are urged to join the Sections in their respective districts ; it is hoped that they will take an active part in the work of the Sections, which must benefit their profession and advance the aims of the Institute. Reports on the proceedings of the Local Sections have been received and published from time to time.

17. HONORARY CORRESPONDING SECRETARIES.

The Council record their appreciation of the help rendered by Honorary Corresponding Secretaries, especially to the General Purposes Committee in connection with the revision of the Bye-Laws and to the Nominations and Examinations Committee in matters affecting the membership of the Institute.

18. APPOINTMENTS REGISTER.

A special article on the Appointments Register was published in the Proceedings, Part IV., 1919 (pp. 26—27). Very many chemists have been introduced to suitable appointments and the number seeking employment has been considerably

reduced. The extent of the work involved is perhaps not fully realised, but it has been unusually heavy and is estimated to occupy, in the aggregate, the whole time of two members of the office staff for at least one day in each week throughout the year. Apart from the preparation, packing and posting of schedules of vacancies, much time is occupied in interviews and correspondence both with chemists seeking appointments and with prospective employers. The Council are satisfied, however, that the Appointments Register is of the highest importance to the well-being of the profession and they ask for the co-operation of all Members in this work, especially bearing in mind the claims of men who have served the country during the war.

30, Russell Square,
London, W.C. 1.
January 30th, 1920.

REPORT OF THE AUDITORS.

We hereby report that we have examined the Books and Accounts of the Institute for the year ended 31st December, 1919, have compared with the Vouchers the entries therein, and certify that the following statements are correct as shown by the Books. Certificates from the Bank of England, and the London County, Westminster and Parr's Bank, Ltd., for investments held by them respectively for the Institute at the above date have been produced.

JAMES CONNAH, } *Hon. Auditors,*
L. T. THORNE, } 1919-20.

DAVID HENDERSON,
Chartered Accountant.

February 4th, 1920.

THE INSTITUTE OF CHEMISTRY

Founded, 1877.

STATEMENT OF RECEIPTS AND EXPENDITURE

		GENERAL	
1918.	RECEIPTS.	£ s. d.	£ s. d.
	Balance at Bank on the 31st		
£320 4 10	Dec., 1918		236 8 0
	Subscriptions—		
1,315 13 0	Fellows'	2,347 5 6	
973 7 6	Associates'	1,897 16 5	
80 10 0	Students'	220 10 6	
			4,465 12 5
1,005 18 6	Entrance Fees	229 7 6	
188 14 3	Dividends and Interest	273 19 1	
22 17 9	Sale of Publications	33 19 9	
66 16 1	Sundry Receipts... ..	38 5 10	
895 7 4	Hire of Laboratories	766 3 10	
36 15 0	Examination Fees	96 1 6	
42 14 9	Appointments Register	93 3 9	
	Advertisements in the Proceed-		
97 5 0	ings	88 0 6	
5,046 4 0			6,321 2 2
	Life Compositions reserved for		
215 5 0	Investment	2,722 4 0	
	Donations	15 0 0	
100 0 0	Repayment of Loan from Build-		
99 9 1	ing Fund	150 0 0	
	Building Fund Account—		
	Interest on Loan		
£5,460 18 1			£9,208 6 2

OF GREAT BRITAIN AND IRELAND.

Incorporated by Royal Charter, 1885.

FOR THE YEAR ENDED DECEMBER 31st, 1919.

ACCOUNT.

1918.	EXPENDITURE.	£	s.	d
£908 12 4	Printing, Stationery, Office Books	1,070	3	6
241 17 10	Postage	429	0	0
300 0 0	Rent	300	0	0
228 1 8	Rates and Taxes	601	4	4
46 14 10	Insurance... ..	43	14	0
179 12 9	Repairs and Furnishing	229	12	6
1,489 3 2	Salaries, Wages, etc.	2,220	19	0
29 6 7	Advertisements	111	12	11
270 12 2	Gas, Water, Electric Light and Power ...	221	14	0
22 11 0	Telephone	21	8	11
68 7 1	Examiners and Assistants (Fees and Expenses)	86	16	9
19 14 5	Apparatus and Materials	123	18	11
25 0 0	Library Account (<i>see over</i>)	50	0	0
25 0 0	Local Section Expenses	65	5	2
70 9 7	Donations... ..	46	0	0
126 4 9	Household, Fuel, etc.	74	14	7
22 18 6	Miscellaneous Expenses	160	11	1
4,074 6 8	Legal Expenses	£5,856	15	8
15 10 5	Glass Research			
700 0 0	Cost of Stocks Bought	2,684	14	3
424 0 0	Reduction of Loan from Bank			
10 13 0	Loan to Building Fund (additional)			
142 10 6	Interest on Loan from Bank			
99 9 1	Balance	676	7	1
5,466 9 8	Amount due from Building Fund			
5 11 7	Less due to Library Fund	9	10	10
£5,460 18 1		666	16	3
		£9,208	6	2

STATEMENT OF ASSETS AND LIABILITIES. Dec. 31st, 1919.

22

ASSETS.			LIABILITIES.		
1918.	£	s. d.	1918.	Subscriptions received in advance—	£ s. d.
£236 8 0	676	7 1		Fellows' ... 58 16 0	
2,850 0 0	2,760	0 0	£18 18 0	Associates' ... 53 9 0	
890 0 0	830	0 0	9 9 0	Students' ... 1 10 0	
511 0 0			3 10 0		113 15 0
				Fees :—	
362 10 0	315	0 0	728 3 6	Applications in abeyance ... 169 11 6	
260 0 0			75 0 0	Rent outstanding ... 75 0 0	
	225	0 0	297 16 4	Accounts Outstanding ... 881 18 4	
361 5 2	779	0 6	7,401 16 6	Amount due to Library Account 9 10 10	
	1,047	4 3		Excess of Assets over Liabilities 9,656 7 2	
2,073 14 2	387	10 0			
	500	0 0			
	750	0 0			
	1,923	14 2			
	103	6 10			
489 16 0	140	0 0			
*£8,534 13 4	*£10,906 2 10		£8,534 13 4		£10,906 2 10

* The above statement does not include the value of the premises of the Institute, Furniture, Library, Apparatus, &c.

BUILDINGS FUND ACCOUNT for the Year ended Dec. 31st, 1919.

RECEIPTS.		£	s.	d.
£167 12 4	Contributions	280	18	2
424 0 0	Loan from General Account (additional) ... ..	...	...	...
<hr/>				
74 19 8	Balance, 31st Dec., 1918 ...	...	...	...
<hr/>				
£666 12 0		£280	18	2
<hr/>				
£74 19 8	ASSETS.	£	s.	d.
	Balance as at Bank, 31st Dec., 1919	55	18	6
	Legacy from the late Edward Riley, Esq., F.I.C.	1,000	0	0
1,000 0 0		<hr/>		
925 0 4		1,055	18	6
1,148 13 10	Excess of Liabilities over Assets	1,251	16	1
<hr/>				
£2,073 14 2		£2,307	14	7
<hr/>				
EXPENDITURE.		£	s.	d.
£43 2 11	Balance as at 31st Dec., 1918	74	19	8
424 0 0	Building Costs:— Contractors and Sub-Con- tractors ... ..	...	...	...
<hr/>				
100 0 0	General Account—Amount paid to Account of Loan ...	150	0	0
99 9 1	General Account—for Interest on Loan for one year at 5%	...	...	...
	Balance at Bank, 31st Dec., 1919... ..	55	18	6
<hr/>				
£666 12 0		£280	18	2
<hr/>				
£2,073 14 2	LIABILITIES.	£	s.	d.
	Loan from General Account	1,923	14	2
	Outstanding Accounts ...	280	13	7
	Interest on Loan due to (General A/c (1919) ...	103	6	10
<hr/>				
£2,073 14 2		£2,307	14	7
<hr/>				

INSTITUTE OF CHEMISTRY BUILDING FUND:

STATEMENT OF RECEIPTS AND EXPENDITURE SINCE THE OPENING OF BUILDING FUND A/c, 1909—1919.

[illegible]

LIBRARY FUND ACCOUNT for the Year ended Dec. 31st, 1919.

[illegible]

Proceedings of the Council and Committees.

Officers and Members of Council.

The Officers and Members of Council who retire at the Annual General Meeting on March 1st, 1920, under the provisions of Bye-Law 30, are as follows:—Vice-Presidents: William Thomas Burgess and Charles Frederick Cross, B.Sc., F.R.S.; Members of Council: Cecil Howard Cribb, B.Sc., Frederick George Donnan, M.A., Ph.D., F.R.S., Ernest Mostyn Hawkins, Harold George Lacell, A.R.C.S., Frederick James Lloyd, William Rintoul, O.B.E., Harry Silvester, B.Sc., Leonard Ellerton Vlies, and Edmund White, B.Sc.

The Officers and Members of Council nominated for election in their stead are:—Vice-Presidents: Horatio Ballantyne and Ernest Mostyn Hawkins. Members of Council: Walter Ernest Adeney, D.Sc., A.R.C.S.I. (Dublin); Allin Cottrell, M.Sc. (Gretna); Lewis Eynon, B.Sc. (London); Charles Alexander Hill, B.Sc. (London); Patrick Henry Kirkaldy (London); Samuel Ernest Melling (Manchester); Gordon Wickham Monier-Williams, O.B.E., M.C., M.A., Ph.D. (London); Frederick Mollwo Perkin, Ph.D. (London); and John Rogers, O.B.E. (Glasgow).

Messrs. Cottrell, Eynon and Melling were nominated under Bye-Law 33.

Glass Research Committee.

In connection with the inquiry made by the Department of Scientific and Industrial Research, mentioned in Proceedings, Part IV., 1919, the Committee has consulted many users of laboratory glassware and chemicals engaged in various branches of work. The views expressed were by no means

unanimous : some chemists appearing to be satisfied that they could carry on their work entirely with British apparatus, others making definite complaints with regard to the quality and the shortage of supplies. In the opinion of the Committee, the quality of the British glass of several firms is, at least, equal to that of Jena ; in some cases it is more resistant to reagents, though not so consistently resistant to heat. In making vessels for laboratory use, British manufacturers have aimed at and reached a very high degree of resistance to chemical action, and it is probable that this may prove to be incompatible with satisfactory resistance to heat ; the composition of the glasses may need modification, therefore, and the Committee understands that manufacturers are continuing their experiments to secure the best results. There is evidence of need for improvement in technique in the blowing of vessels, which are often uneven in thickness or not satisfactorily annealed. Complaints are also made with regard to careless packing.

The diversity of views on the question of quality arises to some extent from the fact that there has been on the market a considerable quantity of unmarked laboratory ware, the origin of which cannot easily be traced. The Committee is prepared to look into complaints with regard to marked apparatus and to advise thereon so far as it is able.

The Committee makes special mention of *test tubes*, with regard to which there appears to be good ground for complaint both as to quality and price. Test tubes made from British soft glass tubing by chemists themselves are invariably more trustworthy than those purchased.

Some chemists have complained of *soft glass tubing* ; but the Committee is assured that excellent British tubing is obtainable, although occasionally there is difficulty in securing sizes of $\frac{1}{2}$ inch diameter and upwards. British *combustion tubing* up to 4 feet in length is obtainable fully equal to Jena. Several users have stated that they prefer it, and although there has been criticism with regard to sizes and thicknesses obtainable, they consider the glass free from certain defects found in Jena tubing.

Funnels are unsatisfactory as to angle. Large boiling flasks are often faulty, owing to unevenness, and these and hard glass round-bottomed flasks are difficult to obtain.

The Committee has communicated its views on the method of graduation of burettes to the National Physical Laboratory. It has also considered complaints with regard to faulty stop-cocks, especially in the fitting and boring of glass taps for burettes, separating funnels, etc. The Committee is aware of the shortage of some types of glass apparatus, and gathers that in a number of instances the technique of apparatus made in the flame leaves a good deal to be desired. On the other hand, there is evidence that substantial progress has been made with this new industry, which should become firmly established.

Business Names.

The Council have considered the question of professional chemists practising under names other than their own.

Apart from the legal requirements of the Registration of Business Names Act, 1916, the Council are mindful of the provisions of Section 16 of the Charter of the Institute, under which a Member who allows any person, not being either a Member of the Institute or in partnership with him as an Analytical or Consulting Chemist, to practise in his name is liable to be excluded or suspended from Membership.

In 1895 the Council expressed the opinion that the qualifications for the practice of chemistry being purely personal, it was highly undesirable that a company or corporation should represent itself as "Analytical and Consulting Chemists."

Although there may be considerable value in business names, the Council feel that there are very grave objections to practices being carried on under the names of deceased or retired chemists, by others who—whether or not equally competent—succeed in some measure to the reputations established by their predecessors. In such instances the successors are obviously not justified in using the initials

indicating the professional qualifications of the previous principals ; but the Council are of opinion that the names of all the partners in a practice should appear on all letters and reports, and that Fellows and Associates should use the initials F.I.C. and A.I.C. in this connection.

It is generally agreed, moreover, that all papers and certificates relating to analyses or other investigations should bear the names of the persons responsible for the work.

Industrial Research.

Criticism has been directed against the selection of the Director appointed by a Research Association recently established under the scheme organised by the Department of Scientific and Industrial Research. The Associations are intended to promote research, but this Association, by placing a higher value on the business aspects rather than on the fundamental scientific aspects of its industry, appears to have misunderstood the main object of its establishment. The successful pursuit of research cannot be expected when scientific work is not under the direction of experienced men of science.

The Council of the Institute, in calling the attention of the Department of Scientific and Industrial Research to the dangers involved, have also expressed their opinion that the officers and research workers of these Associations should be of British nationality.

Chemists and Income Tax.

The Council have been asked by the National Union of Scientific Workers to appoint representatives to join a deputation to the responsible Government Department, presumably the Commissioners for Income Tax, with a view to obtaining and regularising concessions to chemists and others in respect of abatements on subscriptions to Scientific Societies and on the cost of journals, books, clothing, and instruments. The question with regard to clothing has been raised from time to

time by chemists engaged in acid manufacture and similar industries ; but the practice of local surveyors in this and other matters is by no means uniform. The Council have appointed Dr. O. L. Brady, Mr. Cecil H. Cribb, and Mr. F. M. Potter, to act as the representatives of the Institute in this matter.

The Council had already addressed the authorities before hearing from the National Union, with regard to the abatement of income tax on the annual subscriptions of the Fellows and Associates, and on the purchase of technical literature, but their reply has not yet been received. The attention of the Commissioners has been directed to the fact that the possession of the qualifications of the Institute determines to a considerable extent the possibility of the chemist obtaining practice or securing an appointment, and that, in fact, such qualifications are often regarded as essential.

Also bearing on the subject of income tax, the question has been raised by a manufacturing firm as to its liability to be assessed on the proceeds of the sale of processes devised in its research laboratory. The local Surveyor of Taxes contends that such proceeds are profits earned by the firm in the ordinary course of business and in particular by the research department of the firm. The firm contends that although the running of a research department, as a necessary adjunct to successful manufacture, is an ordinary working expense and, therefore, should be charged against revenue, any sum received by the sale of a process should be added to the capital of the firm and should not be regarded as revenue. It seems unreasonable that the Surveyor should claim tax on the proceeds from the sale of the process as well as on the profits derived from its working, since he would be taxing both capital and revenue.

Professional Fees.

The Council of the Institute have received many communications relating to the fees for analyses and investigations at present charged by private practitioners.

Having regard to the facts that, in addition to the increased

cost of living, practising chemists have to pay higher salaries to their assistants and to bear the enhanced cost of apparatus and materials, the Council are of opinion that Fellows and Associates are justified in making a corresponding increase in their fees for professional services.

The conditions of practice vary so much in different branches of work in different parts of the country that the Council find it difficult to recommend a definite rate of increase ; but they learn that some practitioners have doubled their fees, and there appears to be a general agreement that in any case an increase of 50 per cent. on pre-war fees cannot be regarded as excessive.

Public Analysts and Official Agricultural Analysts.

The Councils of the Institute of Chemistry and the Society of Public Analysts have again directed the attention of Authorities concerned with the administration of the Sale of Food and Drugs and the Fertilisers and Feeding Stuffs Acts to the position, under the prevailing economic conditions, of Public Analysts and Official Agricultural Analysts.

An impression appears to prevail rather widely that the salaries and emoluments allowed by the Authorities are wholly in the nature of profit to the Analysts ; but this is far from being the case, as the Analysts have to meet the cost of maintaining their laboratories and staffs, to pay higher salaries than formerly to their assistants, and to bear the greatly increased cost of materials and apparatus, in addition to the increased cost of living. The salaries of qualified assistants are generally more than double, and the prices for apparatus are about three times, those paid before the war.

The Councils understand that some Authorities have already taken the prevailing conditions into consideration, and have revised the terms of their Analysts' appointments ; but the Councils learn that only in a few instances have the Analysts' salaries or fees been adequately advanced, while more generous consideration has been given to non-technical officers and employees, whose positions, although they do not

necessarily involve the provision of staff and equipment at their own cost, have been similarly affected by the decreasing value of money.

Under the provisions of the Sale of Food and Drugs Acts, the Authorities concerned are empowered to pay Public Analysts such remuneration as shall be mutually agreed upon ; additional payments of the kind suggested can be granted, therefore, without reference to the Ministry of Health.

Remuneration of Chemists.

In August, 1919, the Council issued a circular inviting Fellows and Associates engaged in whole-time appointments to send in returns as to their salaries, prospects, and general conditions of employment.

Altogether about 1,000 replies were received. The table given below refers exclusively to appointments in Great Britain and Ireland, since it would be obviously misleading to include those for tropical and other countries where special circumstances have to be taken into account.

A careful study of the returns received reveals such differences in the pay and conditions attaching to the appointment of chemists as to render the preparation of a concise summary an intricate task, but the Council hope that many chemists will be able to make use of the following information to their advantage. The Council would repeat, however, the opinion expressed in Proceedings, Part IV., 1919 (p. 5), that the figures probably represent a lower average rate of pay than that actually received, owing to the circumstance that many members have not forwarded their returns.

It should be borne in mind also that, as these figures represent the returns of chemists who occupy whole-time appointments, they do not constitute a gauge of the progressive financial status of the average chemist, since a very large proportion of the more successful men, as they grow older, cease to occupy such appointments, and either become private practitioners, directors, or owners.

SUMMARY OF PAY STATISTICS RECEIVED FROM CHEMISTS EMPLOYED IN GREAT BRITAIN AND IRELAND :
DECEMBER, 1919.

Number of Chemists employed.		Age.	Average salaries including bonus.			
Industry Assistants to Private Practitioners.	Government Service (whole-time)		Industry Assistants to Private Practitioners.	Government Service	Municipal Service (whole-time)	Average Teaching
			£	£	£	£
25	—	21—24	268	—	—	184
216	—	25—29	345	—	—	270
148	5	30—34	435	289	290	291
87	—	35—39	546	—	300	421
63	3	40—44	606	484	440	400
21	1	45—49	712	400	653	481
20	2	50—54	883	275	775	653
10	—	55—59	609	—	531	766
4	—	60 and over.	610	—	—	888
594	11					
	127					
	50					
	145					
	927					

The table shows (1) the number of returns received under each heading for each age; (2) the ages taken quinquennially (except in the first and last group); (3) the average pay for each heading according to age; and (4) the average pay generally for each age.

The average rate of pay for all branches at 25 years of age is about £310, and the average annual increment up to 30 is about £15. In industry the average rate of pay at 25 years is £320, with annual increments of about £20. The average increment at about 35—45 is not maintained. This may be due to the fact that the more successful men are at this stage setting up in consulting practice or joining the directorate. In three branches of work the number of returns after the age of 45 is not sufficient to afford any definite indication of the position of men of that age.

The returns, on the whole, indicate less discontent than might reasonably have been anticipated in view of the figures given above. For the reasons already stated, they cannot be taken as representing the true position; but they reveal the fact that too many highly qualified men are earning far less than they should at the present time of stress and high prices of all ordinary commodities, especially in view of the wages of skilled labourers, examples of which are here quoted:—

In Shipbuilding—apart from piecework—skilled craftsmen earn (on repairs) up to 86s. 6d. plus 12½ per cent. bonus, a week of 47 hours; and (on new work) up to 75s. 6d., plus 12½ per cent. At 86s. 6d. + 12½ per cent. the total amount for the year is £251 15s. 8d.

In Engineering—up to 80s. 6d. + 12½ per cent. bonus, week of 47 hours, *i.e.*, £235 6s. a year.

In Building Trades—up to 1s. 11d. an hour, 46½ hours a week in summer, 44 hours in winter, *i.e.*, about £225 11s. a year.

In the Furniture Trades—up to 2s. an hour, 47 hours a week, *i.e.*, £4 14s. a week; £244 8s. a year.

Industry.—The returns from chemists engaged in industry are more numerous than the remainder, and will be dealt with first in the following review. These comments, however, will be found to have occasionally some bearing on other branches of work.

It is certain that many chemists occupy positions of responsibility in industry at quite incommensurate salaries,

and that among these are some whose employers do not realise fully the value of the services rendered by their chemists, or do not yet appreciate the need for scientific methods in manufacturing operations. There appear to be still several concerns in which the directors are ignorant of science and, therefore, unapproachable on scientific matters. Their interests lie solely on the business side, and they take little or no interest in the means which contribute so largely to modern developments so long as the ultimate result, from their limited outlook, appears to be profitable. The prospects of promotion of the chemists in such concerns are rendered very uncertain, and they have little chance of success unless they can show an aptitude for commercial matters, or unless their work becomes sufficiently well-known to bring them offers of appointments elsewhere. The bulk of the returns under Industry refer to the salaries of chemists between the ages of 25—34, which may be regarded on the whole as evidence that the demand for chemists has been developed recently, and this should be some encouragement for the future prospects of employment of men now at college.

Comparatively few members of the Institute are less than 25 years of age, owing to the fact that the output from the colleges during the war has been almost negligible. A chemist who hopes to attain managerial responsibility must certainly be a man of affairs, able to represent his employers and to conduct business. They may complain that they wish to remain *chemists*; but the demand is for chemists who are business men. Some, however, who are in sole control of operations on the works complain that they have no voice in the management, policy, or development of their concerns, and that they are called to board meetings merely in an advisory capacity; but it would seem reasonable to suppose that sooner or later, their advice should conduce to the fuller realisation of their worth, especially in view of the fact that the number of chemists who occupy positions as directors is increasing.

The returns show, repeatedly, that the chemists in senior positions are subject to few, if any, unreasonable restrictions ; that they are quite satisfied with their agreements ; that they enjoy a free hand, and are independent of all interference ; have a seat on the management ; are encouraged by the consideration given to their views ; have a share in the profits or a commission (or royalties) on their processes, or, otherwise, " an interest in the business."

A fairly large proportion of the returns have been received from ex-service chemists who have been away from their professional work for several years, and many of these, after a short period on probation, have become settled in far better appointments than they held before the war. They are mainly occupied with works management, and one states that he is " not suspected of being a chemist." The majority have been engaged without formal agreements with sound and well established companies and firms, prepared to treat them on a basis of mutual confidence, good faith, and reciprocal consideration. On the other hand, there are some instances of ex-service chemists who are re-employed at salaries very little in excess of the pre-war salary.

The much vexed question of contracts is by no means to be settled easily by the suggestion that a standard form should be advocated, though that is a suggestion which has been under consideration and will not be overlooked. The conditions of appointments in various industries and localities differ in many respects. The hours of working may begin at 8.30 a.m., or earlier, and close at 6.0 p.m., or later, or may be arranged by shifts in the case of **continuous** operations. In a few instances the system of " clocking on and off duty " applies to the chemists as to workmen. Some chemists are required to live within easy distance of the works, and are liable to be called at any time, day or night ; some are expected to work on Saturdays, Sundays, and Bank Holidays without additional overtime pay, such conditions being provided for in the original agreement, and presumably understood and accepted accordingly. " Overtime " is not very commonly paid among

professional men ; but it should, undoubtedly, be made good, either by periodical material reward or by the allowance of additional leave. Where the chemist is required to travel frequently on behalf of a company of some importance, first-class fares are commonly allowed and hotel expenses, the minimum amount for the latter being given at 15s. per day, a very moderate sum for the pre-war period and certainly too low for the present time, while all hotels are charging high rates and taking advantage of the general shortage of accommodation in important commercial and industrial centres.

Contracts for two or three years are fairly common ; those for five years or more are comparatively few. Generally a company reserves the right to give three months'—in some instances only one or two months'—notice, while the chemist can determine the contract only at the expiration of the term ; but the right of the company is in such cases usually to be exercised only in the event of misconduct or neglect of duty. The chemist is commonly expected to devote his whole time to his appointment ; but some are allowed to undertake private practice by arrangement with the directorate, provided they do not act in any way for the benefit of competitors of the company. No exception is ordinarily taken to chemists pursuing research in their spare time, provided the interests of the employer are not disregarded. Many chemists complain that they are not permitted to publish particulars of their work, all records and results being the property of their principals. In some instances, where publication is allowed, the results appear as the work of the employers rather than that of the chemist who has initiated and conducted the experiments. Chemists who aspire to doctorate degrees or similar qualifications may thereby experience difficulty in establishing their claim for recognition. Some are occupied almost entirely with routine work, though of a varied character, and have no time for research. On the other hand, others are encouraged to publish papers, and enjoy considerable freedom in discussing matters of industrial importance with their professional brethren.

Trade secrets are jealously guarded as far as possible, and restraint from joining competitors is frequently to be enforced for two years or a longer period after the termination of the agreement. In several instances the restraint applies to the British Isles, or the British Empire and America, or is world-wide and for an unreasonable period, so that doubt may be expressed as to the validity of the clauses referred to. Some contracts may be held to be against public interest as well as against the progress of industry. Such questions, however, can only be decided on the merits of each individual case, having regard to all the circumstances. Patents are generally taken out in the joint names of the inventor and the company, but they may become entirely the property of the company. They are sometimes assigned to the company in return for royalties, and the inventor may sell all rights on relinquishing his appointment ; or such matters may be subject to arbitration by an independent authority agreed upon by both parties. These and many other questions must be governed in the main by the good feeling and the ideas of "give and take"—for want of a more definite expression—existing between the chemist and the directorate. Profit-sharing schemes and provision for commissions on results are not uncommon, and few of the returns show ground for distrust of British employers.

Some contracts involving restraint, with binding clauses as to secrecy, provide for a considerable proportion of salary during unemployment for a stipulated period after the chemist has left the company or until he obtains an appointment (within a reasonable time) elsewhere. Penalties are to be imposed for breach of agreement or disclosure of secrets to the disadvantage of the previous employers, and bonds of assurance are entered into on that account ; but many chemists think that consent will not as a rule be withheld so unreasonably as to prevent them from continuing in their profession. It appears advisable that the chemist should beware, however, of too close specialisation over a long period, and should keep abreast of current work generally, so that he may not find it difficult

to turn to a fresh industry. Those who keep themselves well informed have no difficulty in proving their worth in other industries, and in the light of their experience are often able to take a new point of view on the problems submitted to them.

Security of tenure of appointment is generally assured in the case of competent and qualified men in well-established concerns. Many companies provide pensions or superannuation schemes on a liberal basis, the employer contributing—if not the whole—a large proportion of the premiums. Pensions are based on length of service, and generally somewhat on the lines of the Civil Service superannuation scheme, or they may be determined according to the responsibility and the nature of the service rendered. Pay during illness—even prolonged illness—has been frequently allowed and gratefully acknowledged.

In some few appointments there are concessions such as the provision of quarters, luncheons, teas, and so forth.

Prospects.—The prospects of chemists vary very much according to the branches of work in which they are engaged. Those who are engaged in industry have in most instances indicated a fairly satisfactory outlook: many more than formerly hold appointments as managers and assistant managers, or have good reason to expect promotion to such positions; but, while this affords ground for hope that chemists will receive increased recognition and are likely to be employed in greater numbers, it must be remembered that the output from the universities and colleges will in all probability be in excess of the demand for some years in the immediate future. These remarks, however, apply chiefly to chemists engaged in control of operations and in research, but in a less degree to chemists whose work is mainly in analytical laboratories whose prospects are problematical. Advancement often depends as much on the man as on the chemist—on ability, initiative, and resource rather than on high attainments.

Leave.—The allowance of only a fortnight annual holiday besides Bank Holidays appears to be far too common. It is

believed that employers as well as their chemists would benefit from a more generous annual holiday, especially where the chemists occupy positions of responsibility and control. Provision is often made, however, for the annual leave to be extended according to the years of service, and many senior men are at liberty to take Saturdays and occasional short leave at their discretion.

War Bonus.—The replies under this head indicate that war bonuses will generally become permanent additions to salaries. In fact, increased cost of living appears to have been met in most cases by permanent advancement of pay rather than by bonus ; where a bonus has been paid, the amounts have varied from 5 per cent. to 60 per cent., and in a few instances beyond that. In special cases it has been based on a profit-sharing scheme. It should be remembered, however, that a great deal of voluntary professional service of a highly technical character has been rendered by chemists without any form of reward or recognition, and complaints that little consideration has been given to the prevailing economic conditions are fairly numerous. It is difficult to avoid the impression that in some instances the employers took advantage of the fact that chemists above a stated age (varied from time to time) could be retained from military service. The military⁹ authorities frequently refused to enlist chemists, but this was not usually the case where commissions involving some degree of scientific knowledge were available ; there was never any difficulty in securing chemists for active service, while there was occasionally a shortage of those possessing specialised technical experience.

Private Practice.—The returns from assistants to private practitioners are very few (eleven), and afford an unreliable guide to the position. Many assistants who were engaged in private laboratories before the war have gained experience which has enabled them to obtain appointments in industry. In some such laboratories the principals do most of their work themselves, with the help of pupil assistants and labora-

tory attendants. Assistants in some cases have the privilege of working for their own *clientèle* or hold appointments for other work by arrangement with the principals, or are paid according to the varying extent of the practice and the work done.

Teaching.—In teaching the scope for advancement is more restricted than in industry, the number of higher appointments being fewer. The pay shows progressive improvement except for the ages 40—44, but it is very meagre for present conditions, the average rate at 25 years being only £230, with yearly increments of about £25. Many teachers are now overworked through the recent increase in the numbers of students in the colleges. Hours of working are in many cases excessive, especially in technical schools. Holidays are much longer than in other branches of work.

Government.—Government service should show figures at least comparable to any other branch of work ; but although there is a steady rise up to 50 years of age, the figures cannot be said to afford a satisfactory prospect for a qualified man under present conditions. They would hardly have been regarded as encouraging under pre-war conditions, and it is common knowledge that many Government chemists have accepted appointments in other branches, in some cases foregoing their accrued pension contributions. The war bonus of 20 per cent. + £60 * is included in the figures given in the table. Hours of working and the periods of leave are usually more favourable than in industry.

Municipal Service (whole-time) is even less satisfactory than Government service, especially up to the age of 45, when it shows an improvement ; but in this branch the numbers are comparatively few.

Women Chemists.—The returns received from women Fellows and Associates number twenty, and show an average rate of pay in any branch of work considerably lower than that

* Since modified to 30 per cent. + £60.

for men, although many are, undoubtedly, very able workers whose services deserve far more substantial recognition.

Many Fellows and Associates have expressed their appreciation of the proposal that this inquiry should be undertaken. The Council hope that some good may result from the publication of these details, which should provide useful information to employers as well as to their chemists, especially at a time when the need for cordial co-operation and unity of purpose is paramount and the industries of the country are looking to science in an increasing degree to relieve the strain of economic difficulties.

Local Sections.

Irish Section.—A meeting of the Irish Section was held on December 9th, 1919, in the Royal College of Science for Ireland, when Dr. J. H. Millar, F.I.C., and Mr. J. Andrews, B.Sc., A.I.C., gave a demonstration in glass blowing for laboratory purposes. The meeting was well attended by Fellows and Associates as well as by the staffs and students of Trinity College, the National University, the Royal College of Science and the Technical Schools, and representatives from the Royal Dublin Society, the Secondary Teachers' Association, and from a number of works in Dublin. The demonstrations were carried out by Dr. Millar, Mr. Andrews, and a laboratory attendant, while the principles involved and the pitfalls to be avoided were amply and forcibly illustrated by Dr. Millar with neat graphic sketches on the blackboard. Dr. Millar's remarks were extremely useful, interesting, and highly appreciated by the audience, who will probably be stimulated thereby to take up scientific glass blowing as an aid to their laboratory work.

Mr. Fletcher, Assistant Secretary, Department of Agriculture and Technical Instruction for Ireland, in proposing a cordial vote of thanks to Dr. Millar and Mr. Andrews, referred to the enormously enhanced value of a piece of glass tubing in virtue of its utility in the construction of special pieces of apparatus by the process of glass blowing. He considered that, were a local industry established for scientific glass blowing, the outlay would be small, the return prompt, and a very considerable dividend would be likely to be obtained from this industry, which would have the further advantage of being able to supply Dublin and other local centres, on demand, with specimens to meet the requirements of special

needs. He did not see any reason why special courses for college students and post-graduates should not be arranged in the College of Science. If such an industry were commenced in Ireland, the Department of Agriculture and Technical Instruction for Ireland would be prepared to train the workers in methods of scientific glass blowing.

Mr. T. Mason, in seconding the vote of thanks, said that for some time he had been desirous of initiating such an industry, and was anxious to have ex-military men specially trained for this purpose.

Prof. Sydney Young, in supporting the vote of thanks, mentioned that, when he was in Austria taking a course in Chemistry, he took some twelve lessons from a professional glass blower, who supplied the glass for the experimental work, presented him with the pieces of apparatus which he made, gave him detailed instruction, and charged him at the princely rate of 1s. 6d. per hour.

Prof. Adeney, who presided at the lecture, submitted the vote of thanks, which was carried with acclamation. Dr. Millar and Mr. Andrews having replied, the meeting terminated.

At a meeting of the Irish Section, held on Wednesday, January 28th, in the Royal College of Science, Dublin, Dr. Adeney occupying the Chair, Mr. B. G. Fagan, B.Sc., B.A., F.I.C., A.R.C.Sc.I., Additional Public Analyst of Dublin, read a paper entitled "The Functions and Duties of the Public Analyst."

Mr. Fagan pointed out that the Public Analyst holds his appointment under section 10 of the Sale of Food and Drugs Act, 1875. He said that Sir Charles Cameron (who was present at the meeting) was the third Public Analyst to be appointed in the United Kingdom, Dr. Letheby, of London, being the first and Dr. Hill, of Birmingham, the second. Mr. Fagan indicated the objects of the Act and mentioned that whereas in former years adulteration was of a very crude character, it is to-day of a most scientific nature and requires up-to-date methods of analysis for its detection. The procedure adopted in taking

samples officially for analysis was outlined, the salient points being that the Vendor must be informed by the officer that the sample is being purchased for the purpose of analysis by the Public Analyst, and that the sample must be divided into three parts (approximately equal) and sealed, the officer submitting one part to the analyst, giving one part to the vendor and keeping the third part himself. The third part is retained by the officer pending the result of the analysis, and in the case of a prosecution and the analyst's certificate being disputed, this third part is forwarded to the Government Laboratory, if so ordered by the Court.

The speaker proceeded to deal with the various articles of food which the Public Analyst may have submitted to him for analysis and pointed out that in the majority of cases no standards of purity nor legal definitions existed, but that in these cases little difficulty arises as the article is definitely known under a well recognised name and is of a well known character and quality. Of the articles for which standards are fixed, milk is the one which lends itself most to sophistication, and it constitutes the largest percentage of the samples submitted to Public Analysts. Milk must conform to the standards set out in the "Sale of Milk Regulations, 1901," the minimum for fat being 3 per cent., and that for non-fatty solids 8.5 per cent. : these standards give a very respectable margin to the vendor, as milk of average quality contained 3.5 per cent. of fats and 8.8 per cent. of non-fatty solids. The method of calculating the added water in milk was then explained and also the form of the certificate issued by the Analyst.

Should the purchaser of a foodstuff have reason to doubt its quality, he may have such foodstuff analysed by the Public Analyst free of cost, provided he is prepared to give the information necessary for prosecution in the event of the sample proving to be adulterated.

Mention was made of the numerous articles of food which the Public Analyst is liable to have submitted to him, the various forms of adulteration to which they are subject, and

also, in the case of milk, separated milk, cream, butter, margarine, and spirits; the orders governing standards. In the case of drugs, the requirements of the British Pharmacopœia were invariably taken as the standards. In Ireland, besides the samples of drugs taken officially under the Act, a large number of drugs are examined annually for the Poor Law Unions throughout the country. Outside the analysis of these samples submitted under the Act, the Analyst may have to examine a large variety of articles for his local authority and for private individuals, such as waters, oils, disinfectants, soaps, tars, paints, varnishes, asphalts, etc. The Analyst is occasionally called in to cases of a criminal nature and may have to examine stains on clothing and other articles and also human viscera for the detection of poisons.

Mr. Fagan then described a few interesting cases which he had met with in the course of his practice, illustrative of the duties of the Public Analyst, and brought his paper to a close by indicating to the student element of the audience the qualifications required for the position of Public Analyst, mentioning that the Local Government Board would not sanction an appointment unless the candidate possessed the Associateship or Fellowship of the Institute and had passed the recognised examination in the Chemistry of Food and Drugs, etc.

Mr. Douglas Mellon, A.R.C.Sc.I., A.I.C., in proposing a vote of thanks, pointed out that it was a war of wits between the adulterator on one hand, and the analyst on the other. With regard to samples of solids he would suggest that to avoid tampering with samples, bottles should be labelled inside as well as outside.

Mr. G. Brownlee, B.Sc., A.I.C., in seconding the vote of thanks, referred to some butter samples he had recently analysed, which contained up to 30 per cent. of water, and spoke of the desirability of setting up standards for the examination of cheese.

A lengthy discussion followed, in which Messrs. O'Farrelly, Parkes, Wilkinson, Professor Young, Dr. Leonard, and the Chairman took part.

Hon. Sec. (Irish Section) :—Dr. A. G. G. Leonard, B.Sc., F.I.C., Royal College of Science for Ireland, Dublin.

Liverpool Section.—The First Annual Dinner of the Section was held at the Midland Adelphi Hotel on December 5th, Mr. G. Watson Gray, Chairman of the Section, presiding. The guests included Sir Herbert Jackson, President of the Institute, Mr. Alderman William Muirhead, Chairman of the Health Committee of the Liverpool Corporation, and Mrs. Muirhead, Mr. David Cardwell, Hon. Secretary of the Manchester Section, and Mrs. Cardwell, Mr. Richard B. Pilcher, Registrar of the Institute, and Mrs. Pilcher.

The loyal toasts having been proposed from the Chair and duly honoured, Mr. John Gray, President of the Society of Chemical Industry, proposed the toast of "Liverpool: its Industries and Commerce." Mr. Gray referred to the important industries of the city and neighbourhood, especially the heavy chemical industry, remarking that this country had less to fear from foreign competition than from the uncertain position of labour matters at home. In any event, chemists would have to keep abreast of the times in the processes and methods of manufacture.

Mr. Alderman Muirhead, in reply, said that he thought it would be a good thing to endow a Chair at the University for the purpose of teaching trade union leaders something of the principles of political economy. Production was the only way to prosperity; limitation of production was distinctly opposed to progress. A system of grading was necessary; trade union leaders should recognise that some workers were able to do a larger amount and a higher quality of work than others. Every man should be entitled to do his best according to his ability.

Mr. Alderman Muirhead then proposed the toast of "The Institute," expressing his appreciation of the valuable services rendered by chemists in public affairs, such as the protection of food and water supplies, as well as in industry. The chemist was a necessary adjunct in modern industry. Co-operation with the engineer was also highly desirable, especially in relation to problems affecting the utilisation of waste substances.

Sir Herbert Jackson, President, in response, congratulated the Liverpool Section on its formation, its organisation, its activity, and its Chairman. He believed that the Liverpool Section was the first to be formed and the first to hold an Annual Dinner. He referred to the aims of the Institute, its growth, and the development of its work, especially in the formation of a great professional body composed of trained and competent chemists and in maintaining the highest efficiency and integrity in professional work. He wished the Liverpool Section every possible success and prosperity.

Mr. William Doran proposed the toast of "The Ladies," to which Miss Muriel Roberts responded.

Mr. Hanley then submitted the toast of "Our Guests," referring with regret to the unavoidable absence of Lady Jackson, and of Mr. Grant, Chairman of the Manchester Section.

With regard to the remarks of the President, he thought it only fair to say that the first initiatory steps towards forming a section had been taken at Manchester. He was glad to acknowledge that fact, although the Liverpool Section had been the first actually formed. The Section cordially welcomed the guests and appreciated their presence at the first public function of the Section, especially the President, the Registrar, and Mrs. Pilcher, who had travelled from London for the purpose.

The Registrar, in reply, said that the Institute was at all times anxious to be of service to the Sections and to the members individually. Gatherings such as the dinner promoted a good understanding between headquarters and the Sections. He paid a tribute to the work of Mr. John Hanley, the Hon. Secretary of the Section, and expressed the hope that members of the Section would call at the Institute when they came to London. It was a graceful compliment to ask the ladies, who, he was sure, were very pleased to be present. He thanked the local Section very heartily on behalf of all the guests for the toast, for their cordial welcome, and their kind hospitality.

Mr. David Cardwell, Hon. Secretary of the Manchester Section, then proposed the toast of "The Liverpool Section of the Institute, its Chairman, and its Hon. Secretary," and in doing so, complimented the Section on its activity, and particularly on the success of its first Annual Dinner. It was an excellent idea to hold such a function and to bring the work of the Institute and of chemists to the public notice.

Mr. G. Watson Gray, the Chairman, in response, said that it was the aim of the Section to help the Institute and the Council in every way possible; the Section was making good progress, and he hoped that the dinner was the forerunner of many similar happy evenings.

Mr. Hanley also replied.

An excellent programme of music was provided by Mrs. John Hanley, Mr. Lloyd Moore, Mr. Doran, and Mr. W. F. Hughes, to whom hearty thanks were accorded before the company separated.

Hon. Sec.:—John Hanley, F.I.C., 7, University Road, Bootle.

London and South Eastern Counties Section.—The First Annual General Meeting of the London Section was held at the offices of the Institute on November 26th, 1919. Mr. Patrick H. Kirkaldy in the Chair. The Accounts having been adopted, a vote of thanks was passed to Mr. J. Miln Thomson, Hon. Treasurer.

The following members were elected to the Committee in the place of those who retired in accordance with the Rules:—R. T. Collett, R. G. Grimwood, S. J. Johnstone, W. J. Palmer, R. G. Pelly, A. L. Scott, and B. W. J. Warren.

The Chairman, in the course of his address, said that the Report presented by the Committee showed that the Section was in as flourishing a condition as any infant of six months could expect to be; but the membership should be still further increased. The number of Fellows and Associates in the London district was over 800, and of these only 200 had joined the Section. All members of the Section should make every

effort to induce other Fellows and Associates to join the Section.

He then proceeded with the consideration of the training of a chemist, advocating a three years' course at a College or University, followed by a year's practical training in methods of research.

With such a training as he had outlined a young chemist should become competent to work out problems for himself and be able to command an adequate salary soon after the age of 20. He suggested, however, that the college training should begin at an earlier age than was usual at the present time. The age for matriculation at London University was 16, and the examination was often passed before the student left school; but much valuable time was lost through the boy or girl merely marking time for a year before going on with Intermediate work. The tendency was for the chemist to make too late a start on his life's work.

The Chairman summed up his suggestions:—(1) that 16 be the maximum age for entering college, (2) three years' training for the B.Sc., (3) followed by a year's training in methods of research and general laboratory experience, before proceeding to (4) the Associateship and, finally, (5) the Fellowship of the Institute.

A vote of thanks was passed to Mr. Kirkaldy for his address.

Mr. Lees introduced a discussion on the formation of a Benevolent Association for members of the Institute. The object of the fund would be to assist chemists who, through illness or circumstances over which they had no control, had fallen on to necessitous times. It was not a scheme to raise the salaries of chemists nor to provide old age pensions, and it would not clash with any of the Government schemes. Engineers, medical men, and others had similar schemes, and he thought it was time that the Institute took up the question for chemists.

Mr. Pilcher, the Registrar of the Institute, who was present, said that for about twenty years he had controlled an unofficial Benevolent Fund, through which he had disbursed various sums amounting to probably £250. The Council had a fund of the kind in view, but they were anxious, in the first place, to close the Building Fund. He felt positive that the provisions of the Charter would not prevent the Institute controlling such a fund, and he was sure the Council would give careful consideration to any scheme submitted to them.

Several members spoke on the subject, and it was finally decided that the Committee should be instructed to draw up a draft scheme and to submit it to the Council.

At a Committee Meeting held subsequently a scheme was prepared, and the Hon. Secretary of the Section was instructed to submit it to the President and Council of the Institute. The scheme was duly submitted on December 19th, 1919, when it was arranged that a copy should be sent to each Member of the Council, and, after due consideration by them, be referred to the General Purposes Committee.

The Secretary would be glad if all the members of the Section who have not paid their current year's subscription will do so as soon as possible.

Hon. Sec. :—William Bacon, B.Sc., F.I.C., 27, Walbrook, London, E.C. 4.

Newcastle-upon-Tyne and North-Eastern Counties Section.—A General Meeting of the Section was held at the Newcastle Chemical Industry Club, by kind permission of the Committee of the Club, on November 21st, 1919, Mr. C. H. Ridsdale in the Chair. The Committee was elected and the Hon. Secretary appointed. A general discussion ensued on various subjects of professional interest.

Hon. Sec. :—Dr. J. H. Paterson, F.I.C., 3, Park Villas, The Green, Wallsend-on-Tyne.

South Wales Section.—The Annual Meeting of the Section was held at the Mackworth Hotel, Swansea, on November 22nd, 1919, when the Committee for the Section was elected and the order of retirement of its members was settled. The Local Section Rules were also formally adopted.

Papers on the following subjects have been promised for the present session :—Intensive working of a sulphuric acid chamber, the contact process for sulphuric acid, detonators, transmission of photographs by telegraphy, and low temperature carbonisation.

Hon. Sec. :—Arthur J. Shelton, F.I.C., 10, Park Road, Clydach, R.S.O., Glamorgan.

Examinations.

At the Examinations held in January, eight candidates presented themselves. The following were successful :—

For the Fellowship.—In the Branch of Metallurgical Chemistry : G. B. Brook ; in the Branch of the Chemistry of Food and Drugs, Fertilisers and Feeding Stuffs, Soils and Water : F. F. Beach, M.A. (Oxon.), B.Sc. (Lond.).

For the Associateship.—In the Branch of Organic Chemistry : H. H. Barber, B.Sc. (Lond.), L. P. McHatton, A.R.C.S., and H. C. S. De Whalley ; in the Branch of the Chemistry of Food and Drugs, Fertilisers and Feeding Stuffs, Soils and Water : John Haycock and Miss E. E. Sparling.

Branch (b).—Metallurgical Chemistry. January 5th to 9th, 1920.

MONDAY, JANUARY 5th : 10 a.m. to 1 p.m.

(Five questions only to be attempted.)

1. What are the most important refractory materials in use in the non-ferrous industries ? What materials would you use for lining (a) a copper blast furnace ; (b) a muffle furnace for roasting zinc blende ?

2. Describe in detail some form of electric smelting furnace, showing the electrical connections and explaining how the fluctuations of current during the smelting of the charge are overcome.

3. In the manufacture of alloy steels, how are the additions of the alloying metals made ? How may the added elements be prepared free from carbon ?

4. Give an account of the process of corrosion of brass condenser tubes. What are the principal causes of such corrosion, and what modifications of the usual composition have been found to lessen the liability to corrosion ?

5. Describe the modern method for the production of metallic aluminium from the ore. What are the usual impurities, and in what proportions do they occur ? What qualities are required in aluminium for chemical plant ?

6. How would you determine accurately the temperature of a mass of molten metal in a crucible, the temperature being above 1,200° C. ? Describe in detail one form of optical pyrometer, explaining the principle on which it is constructed.

TUESDAY and WEDNESDAY, JANUARY 6th and 7th : 10 a.m. to 4.30 p.m.

Make a full analysis of the given ore.

THURSDAY, JANUARY 8th : 10 a.m. to 4.30 p.m.

Examine the given alloy by means of the microscope, and sketch the structure. Quench a portion from $700^{\circ}\text{C}.$; anneal another for two hours at that temperature, cool slowly, and determine the change of structure in each case.

FRIDAY, JANUARY 9th : 10 a.m. to 4.30 p.m.

Assay the given ore for gold and silver, and report on the principal impurities present.

Branch (d).—Organic Chemistry. January 5th to 9th, 1920.

MONDAY, JANUARY 5th : 10 a.m. to 1 p.m.

(The candidate is expected to attempt five questions only.)

1. Discuss the saturated series of hydrocarbons, C_nH_{2n} , and contrast their physical and chemical properties with those of the corresponding members of the paraffin and olefine series.

2. Describe the methods of preparation of the aliphatic nitro-compounds. In what respects do these substances differ chemically from (a) the aliphatic nitrites and (b) the aromatic nitro-compounds?

3. How may indol derivatives be prepared, starting from phenylhydrazine? Discuss any recent views of the mechanism of the changes which occur in this synthesis.

4. Describe two methods of the large-scale manufacture of picric acid starting from benzene.

5. Give a short account of the Sabatier and Senderens method of hydrogenation and dehydrogenation of organic compounds, and describe one industrial application of the process.

6. Describe methods of preparation of (a) ammonium thiocyanate and (b) thiocarbamide. What constitutional formulæ would you ascribe to these two substances, giving the reasons for your conclusions?

TUESDAY and WEDNESDAY, JANUARY 6th and 7th : 10 a.m. to 4.30 p.m.

1. A is a sample of commercial benzol for use as motor spirit sold as complying with the specification given below. Examine the sample and report whether it complies with the specification, giving the exact result obtained in respect of each clause in the specification.

2. From the commercial product prepare, by any suitable means, a sample of pure benzene, and on the sample obtained determine (a) the specific gravity at $15.5^{\circ}/15.5^{\circ}$; (b) its boiling point range, corrected for barometer and emergent stem; and (c) its freezing point.

SPECIFICATION.

1. Specific gravity at $15.5^{\circ}/15.5^{\circ}$ not lower than 0.870 or higher than 0.885.

2. When distilled in a Wurtz flask, with thermometer in the vapour, the sample shall give:—

Not less than 75 per cent. by volume at $100^{\circ}\text{C}.$ (corrected).

Not less than 90 per cent. by volume at $120^{\circ}\text{C}.$ (corrected).

The flask shall be dry at $125^{\circ}\text{C}.$

3. The sulphur present in the form of carbon bisulphide shall not exceed 0.4 per cent. by weight.

4. The sample shall be colourless.

5. The sample shall be free from water, acids, alkalis, and sulphuretted hydrogen.

6. 10 c.c. of the sample, when shaken with 90 c.c. of 90 per cent. sulphuric acid for 5 minutes, shall not impart more than a light brown colour to the acid layer.

7. 10 c.c. of the sample, when shaken with 100 c.c. of water, 10 c.c. of dilute sulphuric acid (1:3), and 50 c.c. of deci-normal potassium permanganate solution for 3 minutes, shall not absorb a greater amount of oxygen than 0.01 gram per 100 c.c.

8. The sample shall not deposit benzene crystals when cooled to 7° F.

THURSDAY and FRIDAY, JANUARY 8th and 9th : 10 a.m. to 4.30 p.m.

You are provided with a sample of an organic acid, B.

1. Identify the acid. (Oxalic acid.)

2. Prepare from it a sample of its methyl ester, purify the product, and determine its melting and boiling point. Estimate the quantity of alkali required to hydrolise the ester and, assuming the elementary formula of the acid, calculate its basicity from the results obtained.

3. Prepare from the acid two crystalline derivatives containing nitrogen (other than its ammonium salt) and ascertain their melting points. Give experimental evidence showing the manner of combination of the nitrogen atom in the atoms in the substances.

Record throughout the weights of the acid and reagents taken and the weights of crude and purified products obtained.

Branch (c).—The Chemistry (and Microscopy) of Food and Drugs, etc. January 5th to 9th, 1920.

MONDAY, JANUARY 5th : 10 a.m. to 1 p.m.

1. State what you know of the official limits or regulations relating to the composition of milk, butter, margarine, and cream at present in force in this country.

2. What approximate percentages of nitrogen and of calcium phosphate would you expect to find in average samples of bone meal, fish guano, hoof and horn meal, and dried blood? What approximate percentages of oil and of "albuminoids" occur in average samples of bean meal, linseed cake, decorticated ground-nut (*Arachis*) cake, and Egyptian cotton-seed cake?

3. Describe such processes as you are acquainted with for the softening of water supplies.

2 p.m. to 5 p.m.

1. Enumerate the official preparations of metallic mercury and of its halogen salts. Describe the characteristic symptoms of poisoning by mercury in its acute and chronic forms respectively.

2. Give the medicinal doses and approximate minimal lethal dose of: *acidum arseniosum*, *antimonium tartaratum*, *hydrargyri perchloridum*, *strychnia*, *morphinae hydrochloras*, *chloral hydras*; and the medicinal doses of: *tinctura digitalis*, *tinctura nucis vomicae*, *tinctura ergotae*, *tinctura hyoscyami*.

3. Discuss cases in which the microscope is useful in the identification of drugs and in the practice of toxicology.

MONDAY, JANUARY 5th : 2 p.m. to 5 p.m.

1. The lime juice, A, contains an inorganic poison. Give an opinion as to whether its amount is sufficient to make the consumption of the beverage dangerous to health.

2. Prepare slides for the microscope showing to advantage the corpuscular elements of blood.

3. Examine microscopically the powder, B, and report upon its nature.

TUESDAY, JANUARY 6th : 10 a.m. to 4.30 p.m.

Determine the potash, sulphuric acid (calculated as SO_3), and chlorine, present as chloride, in the sample of commercial "potash salts." (The potash to be determined by the perchlorate method.)

Examine the "mineral water" spectroscopically, and state what elements you identify.

WEDNESDAY, JANUARY 7th : 10 a.m. to 4.30 p.m.

Report as fully as you can on the sample of castor oil.

Identify the white powder provided. (Morphine acetate.)

THURSDAY, JANUARY 8th : 10 a.m. to 4.30 p.m.

Ascertain whether the sample of borax complies with the requirements of the British Pharmacopœia.

Make as complete an analysis as you can of the sample of milk, reporting, in addition to the percentages of fat and of non-fatty solids, how far the composition of the latter agrees with or differs from the average composition found in normal milk.

(This exercise may be completed to-morrow.)

FRIDAY, JANUARY 9th : 10 a.m. to 4.30 p.m.

Finish the analysis of the milk sample provided yesterday.

Determine the percentage of calcium phosphate in the sample of bone meal.

Branch (g).—Chemical Technology of Petroleum and Petroleum Products. January 5th to 9th, 1920.

MONDAY, JANUARY 5th : 10 a.m. to 1 p.m.

(Candidates are expected to attempt four questions.)

1. You are required to separate a soluble from an insoluble solid (a) by systematic continuous lixiviation by water, (b) by means of a volatile solvent which must be recovered. Sketch the necessary plant and explain the method of operating it.

2. Sketch and discuss the various arrangements for agitating a liquid with a small proportion of another liquid (a) lighter, (b) heavier than itself, specifically.

3. Make diagrammatic sketches of an arrangement of six vacuum filters, with the necessary receivers, pump, and provision for emptying the receivers, and a sectional sketch of one of the filters.

4. Discuss the rate of heat transmission to a liquid using steam in pipes and in double-jacketed vessels, referring to the effect of temperature differences, presence of air, rate of movement of the steam and the liquid, length of steam heating pipe and area of double bottom, nature of the liquid heated.

5. Explain the principle of multiple effect evaporation. Make a diagram of a triple-effect evaporation plant, showing the arrangement of the necessary traps, condenser, and pump, and a sectional sketch of the evaporator and condenser.

6. Two immiscible liquids, A and B, are heated in the same vessel by passing the vapour of A through them; state the physical constants on which the proportions by weight of the two liquids in the distillate depend, and show how they are related. Sketch a still for rectifying benzol and explain its operation.

MONDAY, JANUARY 5th : 2 p.m. to 5 p.m.

(Candidates are expected to attempt four questions.)

1. Discuss the action of sulphuric, hydrochloric, and nitric acids on wrought iron and on cast iron, referring to the influence of the temperature, concentration of the acids, and the composition of the metals.

2. You are required to arrange to pump concentrated sulphuric acid from a 20-ton storage tank, supported 10 feet above ground level, through a pipe line 100 feet long and terminating 25 feet above the ground, to a gauged tank of 40 gallons capacity, graduated in gallons, and provided with a run-off cock. Sketch the arrangements and specify all the materials used in the construction of the tanks and connections.

3. State the composition of Portland cement and explain what happens when it is mixed with water to form a mortar and allowed to stand. Describe shortly the physical tests which are used in valuing cements.

4. Describe any form of water-softening plant using lime and sodium carbonate, and any apparatus for de-oiling water. Given the results of hardness estimations, explain how you would calculate the weights of chemicals necessary for softening.

5. Sketch any form of gas producer and describe the method of operating it. What is meant by the efficiency of a gas producer, and how is it ascertained, assuming that no meter is available for the measurement of the gas?

6. Discuss the relative merits of oil and coal as fuels for the generation of power and heat, referring to supply, storage, calorific value, labour in handling and stoking, efficiency in use under steam boilers, efficiency of oil in internal combustion engines.

TUESDAY, JANUARY 6th : 10 a.m. to 1 p.m.

1. Write a short dissertation on the various theories of petroleum formation and give reasons for or against.

2. Describe a satisfactory process for manufacturing *Paraffinum Liquidum*. From which districts are the best oils for the purpose of making this product obtained? What plant is necessary? Which oils are the easiest to work?

3. What method or methods would you adopt to examine an oil for saturated and unsaturated hydrocarbons?

4. From what source is Montan wax obtained, how is it produced, and what is its use ?

5. What are the chief difficulties in relation to the commercial development of low temperature carbonisation of coal, lignite, etc., for the production of oils ? Describe with sketches two forms of plants by which it is proposed to overcome the difficulties.

6. Describe the methods employed for the separation of pure paraffin wax from crude mineral oils.

TUESDAY, JANUARY 6th : 2 p.m. to 5 p.m.

1. What are the main differences between the oils obtained by the destructive distillation of shales as practised in Scotland, and an American natural mineral oil ? How do the differences affect the methods of refining ?

2. Certain natural oils contain aromatic hydrocarbons, such as benzol and toluol. How would you analyse an oil to ascertain the proportions of these hydrocarbons ? Devise a commercial scheme for abstracting these hydrocarbons from the other hydrocarbons.

3. Give a description of the methods employed for removing sulphur from mineral oils, both on a large and small scale. In what form does the sulphur probably exist ?

4. Describe the Edeleanu process for purification of petroleum—give a diagrammatic sketch descriptive of the plant.

5. Describe two processes for the cracking of heavy oils to produce motor spirit. What class of spirit is produced, and in what respects does it differ from petrol from natural sources ? In what way would you refine it ?

6. How would you determine the amount of sulphur in : (1) light oils ; (2) in heavy oils such as heavy fuel oil ? Describe the apparatus in both cases.

WEDNESDAY, JANUARY 7th.

The candidate was examined orally in the interpretation of drawings of plant, etc.

PRACTICAL.

THURSDAY and FRIDAY, JANUARY 8th and 9th : 10 a.m. to 4.30 p.m. each day.

1. A and B are two samples of crude mineral oil as obtained from the wells. (One is from a British source, and the other from Trinidad.)

(1) Examine these and compare their physical constants.

(2) Fractionate these oils and compare the fractions taking their physical constants.

Give your opinion as to the relative commercial value of the two oils.

2. The bottle given you contains a sample of powdered oil shale. Estimate its volatile matter and the amount of mineral matter and fixed carbon.

TRANSLATION.

Time allowed : 2 hours.

Translate into English.

Propriétés physiologiques.—Les composés mercuriels, appliqués sous forme de pommade sur la peau intacte, exercent une action locale irritante (hydrargyrie) qui, le plus souvent, se traduit par une éruption eczémateuse.

Lorsqu'un composé mercuriel soluble est introduit dans le tube digestif, les effets produits varient avec la nature de ce composé. Le sublimé corrosif, par exemple, provoque, à doses peu élevées, la sensation dans la bouche d'une saveur métallique désagréable; surviennent ensuite des douleurs épigastrique accompagnées d'un sentiment de chaleur, des nausées, des vomissements quelquefois, des coliques, de la diarrhée. La salivation ne tarde pas à s'établir. Mais il y a, à cet égard, des différences très grandes suivant les individus relativement à la rapidité avec laquelle survient cette salivation. C'est l'inhalation des vapeurs mercurielles en nature qui présente, sous ce rapport, les effets les plus prompts.

L'absorption d'une forte dose d'un composé mercuriel soluble (supérieure à 0 gr. 15 de sublimé, dose qui peut occasionner la mort) s'accompagne des phénomènes dits d'hydrargyrisme aigu: ce sont ceux qui viennent d'être mentionnés, mais avec une intensité incomparablement plus forte.

L'empoisonnement chronique par le mercure (ouvriers des mines, chapeliers, doreurs, étameurs de glaces) se traduit par une stomatite fétide et par un tremblement, caractéristique qui commence d'abord par les membres supérieurs, puis s'étend aux membres inférieurs, et qui s'accompagne de crampes douloureuses, de paralysies et de troubles de l'intelligence.—*Henri Moissan.*

Translate into English.

Die Darstellung des unvollständig reducirten Zwischenproductes kann man im offenen Gefäß ausführen: Zu seiner Bereitung liessen wir zu dem trocknen, fein gepulverten Gemisch von 6 g. Glucosaminsäure, 6 g. rothem Phosphor und 25 g. Jod, das sich in einem mit Rückflusskühler verbundenen, nicht zu kleinen Kolben befand, 20—25 c.cm. Wasser fliessen. Nach kurzer Zeit beginnt die heftige Reaction, die später, durch Erwärmen unterstützt, 4 Stunden lang im Gang erhalten wird. Die in üblicher Weise mit Bleicarbonat und Silberoxyd von Säuren des Phosphors und Jodwasserstoffs befreite Lösung krystallisirte beim Eindampfen. Das Rohproduct (ca. 4 g.) kann direct zur Weiterverarbeitung dienen. Zur Analyse wurde die Substanz aus Wasser, dann aus Methylalkohol bis zur Constanz des Schmelzpunktes umkrystallisirt. Die Verbindung hat gleiche procentische Zusammensetzung wie die von Fischer und Tiemann, schmilzt aber 30° niedriger, bei 190—200°. Möglicherweise liegt ein Isomeres vor, das durch Reduction anderer Hydroxylgruppen entstanden ist.—*Beichte, 1902.*

Personal.

DEATH OF MR. CHARLES E. GROVES, F.R.S.—The Council regret to record the death of Mr. Charles Edward Groves, an Original Fellow of the Institute, who rendered valuable service as Secretary from 1877—1887, Registrar and Secretary from 1887 to 1892, and Vice-President from 1892 to 1895.

The following Honours and Decorations received by Members and Students have not previously been recorded in the Proceedings :—

C.B.E.

Lieut.-Colonel Arthur William Crossley, C.M.G.	Prof. David Orme Masson, F.R.S.
Frank William Harbord.	Lieut.-Colonel Henry Stanley Raper.
Prof. William Robert Eaton Hodgkinson.	

D.S.O.

Lieut.-Colonel Sidney Waterfield Bunker, M.C.	Lieut.-Colonel James Theodore Janson. (D.S.O. and bar).
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O.B.E.

Capt. John Stanley Arthur.	(The late) Lieut. Harold Cecil Greenwood.
Major William Ringrose Gelston Atkins.	Fred Holt.
Frederick Guy Stirling Baker.	Capt. Arthur Vivian Hussey.
Capt. George Neville Blackshaw.	Major Gordon Wickham Monier-Williams, M.C.
Lieut.-Commander Joseph Edward Coates.	Owen Edwin Mott.
Major Herbert Frederick Doidge.	James Charles Philip.
Major Stanley Elliott.	Lieut.-Commander Thomas Slater Price.
Major George William Ellis.	Capt. Ralph William Ewart Stickings.
Capt. Francis Arthur Freeth.	Major John Christison White, M.C.
Lieut.-Colonel Frederick Charles Garrett.	Evelyn Charles Bootle Wilbraham.
Capt. Charles Denis Victor Georgi.	
Capt. Conrad Theodore Gimingham.	

M.B.E.

John Alexander Cockburn.	Lieut. Eric Keightley Rideal.
Lieut. Bernard Scott Evans, M.C.	Capt. Frank Sturdy Sinnatt.
Major Edward Hinks.	Capt. Edward McKenzie Taylor.

M.C.

Capt. Lauchlan Henry Dyke Acland.	Capt. James Bruce Miller.
Lieut. Ernest George Balls.	Capt. Horace Victor Parker.
Major Robert Bruce.	Capt. David Powell.
Lieut.-Colonel Sidney Waterfield	Staff-Capt. Percy Harry Robinson.
Bunker, D.S.O.	Major Wilfred Austin Salt.
Lieut. Alfred Thomas Eggington.	Major Thomas Scott.
Lieut. John Arthur Heald.	Lieut. Robert Forbes Stewart.
Major Adrian Eliot Hodgkin.	Major Andrew Theodore Sumner.
Lieut. Hubert Jennison.	Capt. Thomas Wallace.
Major Hamilton McCombie, D.S.O.	Major Arthur Wilson.

D.S.C.

Lieut. Noel Charles Akers.

. D.C.M.

Flight-Cadet Russell Mervyn Doidge. | William Wylie Macfarlane.

MENTIONED IN DESPATCHES.

Lieut. Alfred Thomas Eggington,	Capt. William John Read.
M.C.	Staff-Capt. Percy Harry Robinson,
Major George William Ellis, O.B.E.	M.C.
Capt. Stanton Gibson.	Capt. Harry Stanley.
Capt. Arthur Frank Girvan.	Lieut. Ernest Victor Suckling.
Lieut. John Arthur Heald, M.C.	Capt. Edward McKenzie Taylor,
Capt. Arthur Vivian Hussey, O.B.E.	M.B.E.
Lieut.-Colonel James Theodore Jan-	
son, D.S.O. (five times).	

M.S.M.

Geoffrey Coupe.

DISTINCTIONS CONFERRED BY THE ALLIES.

Lieut.-Colonel Samuel James Manson Auld, M.C., American Distinguished Service Medal.
 Capt. Robert Gordon Berry, Croix de Guerre.
 Lieut.-Colonel Arthur William Crossley, C.B.E., C.M.G., Officer of the Legion of Honour.
 Capt. John Golding, D.S.O., Chevalier du Mérite Agricole.
 Lieut.-Colonel Isodore Morris Heilbron, Gold Cross, and Order of the Redeemer, Greece.
 Lieut. Ernest Gunn Macintyre, Officier de l'Ordre du Nichian Iftakar.
 Major Hamilton McCombie, D.S.O., M.C., Croix de Guerre.

So far as can be ascertained at present, the following Honours have been conferred and Awards made to Members and Students since August, 1914:—1 Baronet, 1 G.B.E., 1 K.C.M.G., 5 K.B.E., 2 Knights, 1 C.B., 4 C.M.G., 11 C.B.E., 1 D.S.O. and bar, 7 D.S.O., 38 O.B.E., 19 M.B.E., 44 M.C., 1 D.S.C., 4 D.C.M., 1 D.S.M., and 1 M.M., in addition to many "mentions" and 18 foreign distinctions.

Prof. C. H. Desch has been appointed Professor of Metallurgy in the University of Sheffield, in succession to Prof. J. O. Arnold.

Dr. J. E. Stead has been nominated President of the Iron and Steel Institute for 1920.

Prof. Robert Robinson, formerly of the Department of Organic Chemistry, Liverpool University, has been appointed Director of Research in the Dyestuffs Department of the British Dyestuffs Corporation at Huddersfield.

Dr. Edward Arden, formerly chief chemist at the Manchester Corporation Rivers Committee has entered into partnership with Mr. S. E. Melling, and now acts as consulting chemist to the Rivers Committee.

Dr. Samuel Smiles has been appointed Daniell Professor of Chemistry at King's College, London.

The Gold Medal of the Institution of Mining and Metallurgy has been conferred upon Mr. H. L. Sulman in recognition of his contributions to metallurgical science with special reference to his work on the development of flotation processes.

Prof. T. H. Easterfield, Professor of Chemistry in the University of New Zealand, has been appointed Director of Gawthorn Research Institute in New Zealand.

Dr. H. T. Calvert has been appointed Chemical Inspector in the Engineering Department of the Ministry of Health.

The University of Paris has conferred the Diploma of Docteur *Honoris Causa* on Prof. H. G. Greenish.

Books and their Contents.

The following notes indicate the contents of books recently published. Similar notes will appear in the next and subsequent Parts of the Journal:

- “Alcohol: Its Production, Properties, Chemistry and Industrial Application.” With Chapter on Methyl Alcohol, Fusel Oil, Spirituous Beverages. By C. Simmonds, F.I.C. Pp. xx & 574. (London: Macmillan & Co., Ltd.) 21s. net.

Outline of production; general chemistry of alcohols; methyl alcohol; ethyl alcohol; analysis; alcoholometry; industrial alcohol; alcohol, as source of light, heat, power; fusel oil; spirituous beverages; physiological effects; bibliography.

- “Applied Chemistry.” By Dr. C. K. Tinkler, F.I.C., and H. Masters. Vol. I. Pp. xii & 292. (London: Crosby, Lockwood & Son.) 12s. 6d. net.

Water analysis; softeners; soap; textile fibres; bleaching agents; dry cleaning; air analysis; gaseous fuels; liquid and solid fuels; materials for protection of wood, metal, etc.

- “Boiler Feed Water.” By P. G. Jackson, F.I.C. Pp. vii & 91. (London: C. Griffin & Co., Ltd.)

Mineral constituents; corrosion; softening; selection of softening plants; priming; scale, grease, and overheating; methods of analysis; control tests for water softening; sampling; solutions; appendix (tables).

- “Catalysis in Theory and Practice.” By Dr. E. K. Rideal, F.I.C., and Prof. H. S. Taylor. Pp. xv & 496. (London: Macmillan & Co., Ltd.) 17s. net.

History; reaction velocity; oxidation; hydrogenation; dehydrogenation; fixation of nitrogen; hydration and hydrolysis; dehydration; applications of catalysis to organic chemistry; ferments and enzymes; catalysis in electro-chemistry and in analytical chemistry; catalysis by radiant energy.

- “Chemical Calculation Tables.” By Prof. H. L. Wells. Second edition. Pp. v & 43. (New York: John Wiley

& Sons. London: Chapman and Hall, Ltd.) 6s. 6*d.* net.

Atomic weights; gravimetric factors; formula weights; indirect analysis; reduction of gas volumes to 0° and 760 mm.; percentage of nitrogen from gas volume; barometer corrections for temperature; multipliers for organic compounds.

"Chemists' Manual of Non-Ferrous Alloys." By J. R. Downie. Pp. 168. (London: E. and F. N. Spon, Ltd.) 10s. net.

Laboratory and fittings; detection of metals, etc.; gravimetric estimations; volumetric estimations; colorimetric estimations; refraction; alloys; coal, water, fireclay, etc.; typical analysis; data.

"Chemistry and Technology of the Diazo Compounds." By Dr. J. C. Cain, F.I.C. (London: E. Arnold, 1920.) Second edition. 19s. 6*d.* net.

Preparation; mechanism of process; reactions; action of reagents; formation of diphenyl derivatives; interchange of groups; action of light; azo compounds; metallic derivatives; diazo hydroxides; diazo compounds of aliphatic series; heterocyclic diazo compounds; constitution; history; theory.

"Chemistry in Everyday Life." By Ellwood Hendrick. (University of London Press.) 3s. 6*d.* net.

"Classbook of Organic Chemistry for Second-year Students." By Prof. J. B. Cohen. Vol. II. Pp. 158. (London: Macmillan & Co., 1919.) 4s. 6*d.* net.

"Condensed Chemical Dictionary (A)." Compiled and edited by the Editorial Staff of the "Chemical Engineering Catalogue." Pp. 525. (New York: Chemical Catalogue Co., inc.) \$5.

"Course of Practical Chemistry for Agricultural Students, A." By Prof. H. A. D. Neville, F.I.C., and L. F. Newman, F.I.C. Vol. II., Part I. Pp. 122. (Cambridge University Press.) 5s. net.

Composition and purification of organic compounds; hydrocarbons; alcohols; phenols; aldehydes; ketones; acids, etc., etc.

"Dyeing Industry, The." By S. H. Higgins, M.Sc., A.I.C. (Third edition of "Dyeing in Germany and America.") (London: Longmans, Green & Co.) 8s. 6*d.* net.

Cop-dyeing, sulphur colours and indigo; mercerising; bleaching; German and English flannelettes; the industry in U.S.A.; efficiency; instruction; progress; colour production.

- "Explosives." By E. de Barry Barnett, B.Sc., A.I.C.
Pp. x & 241. (London: Bailliere, Tindall and Cox.)
12s. 6d. net.

Gunpowder; explosive compounds; smokeless propellants; blasting explosives; safety coal mine explosives; percussion cap detonators and fuzes; matches, pyrophoric alloys and pyrotechny; explosive properties; sensitiveness and stability.

- "Glass Manufacture." By Dr. W. Rosenhain, F.R.S. Second edition. (London: Constable & Co.) 12s. 6d. net.

Physical and chemical properties; raw materials; refractories; furnaces; processes; bottle glass; blown and pressed glass; rolled and plate glass; sheet and crown glass; coloured glass; optical glass; miscellaneous products; composition of typical glasses; bibliography.

- "Industrial and Manufacturing Chemistry. Part I.: Organic." By Dr. Geoffrey Martin, F.I.C. 1920. Fifth edition, being fourth edition with minor alterations, particularly in regard to hydrogenation of fats, and malt analysis and waterproofing of cloths. Pp. xii & 744. (London: Crosby Lockwood & Son.)

- "Industrial Gases." By Dr. H. C. Greenwood, F.I.C. Pp. xvii & 371. (London: Bailliere, Tindall and Cox.) 12s. 6d. net.

Gases of the atmosphere; H_2CO , CO_2 , SO_2 , N_2 , O_2 , asphyxiating gases; gaseous fuels; in each case treating of the occurrence, properties, manufacture, application, detection, and estimation.

- "Manuals of Chemical Technology: V. Sulphuric Acid and Sulphur Production." By Dr. Geoffrey Martin, F.I.C., and Major J. L. Foncar. Pp. viii & 72. (London: Crosby Lockwood & Son.) 9s. net.

The sulphur industry; sulphuric acid; manufacture of SO_2 ; and sulphites, and of other S. compounds.

- VI. The Salt and Alkali Industries. By Dr. Geoffrey Martin, F.I.C., S. Smith, F.I.C., and F. Milson, B.Sc. Pp. viii & 100. (London: Crosby Lockwood & Son.) 9s. net.

The salt industry; manufacture of hydrochloric acid; of sodium sulphate; general survey of sodium carbonate industry; manufacture by Leblanc process and by ammonia soda process; Stassfurt industry; potassium salts.

- "Manufacture and Testing of Military Explosives." By Dr. J. A. Marshall. Pp. 253. (New York: McGraw Hill Book Co. inc., 1919.) 15s. net.

Part I.: Propellants. Part II.: High Explosives.

- "Manufacture of Chemicals by Electrolysis." By A. J. Hale, B.Sc., F.I.C. Pp. vi & 80. (London: Constable & Co., 1919.)

Electrolytic hydrogen and oxygen; ozone; production of per salts and hydrogen peroxide; nitric acid; hydroxyl-amine hydrosulphites; fluorine; electrolytic preparation of pigments and insoluble substances; electro-osmotic and electro-colloidal processes; electrolytic reduction of organic compounds; oxidation and substitution of organic compounds.

- "Coal Tar Dyes and Intermediates." By E. de Barry Barnett, B.Sc., A.I.C. Pp. xi & 214. (London: Bailliere, Tindall and Cox.) 10s. 6d. net.

The intermediate compounds, nitration, amidation, sulphonation, hydroxylation, miscellaneous; the dyestuffs; the nitrosodyes; the nitrodyes; the azodyes; the diphenylmethane dyes; the triphenylmethane dyes; the indamines and indophenols; the azines; the oxazines; the thiazines; the indigoid dyestuffs; the anthraquinone dyes; the quinoline dyes; the acridine dyes; the sulphur or sulphide dyes.

- "Metals of the Rare Earths." By Dr. J. F. Spencer, F.I.C. Pp. vii & 279. (London: Longmans, Green & Co., 1919.) 12s. 6d. net.

History; occurrence; separation; control of fractionation; cerium group; yttrium group; thorium group; atomic weight determinations; rare earths and periodic system; uses.

- "Oil Analysis." By A. H. Gill. Ninth edition. (Philadelphia: L. B. Lippincott & Co.) 10s. 6d. net.

Burning oils; lubricating oils; petroleum products; animal and vegetable oils; derivation; description and examination; drying, semi-drying and non-drying oils; waxes; waste fats; lubricating greases; edible fats; hardened oils.

- "Paper Mill Chemist, The." By Dr. H. P. Stevens, F.I.C. Second edition. Pp. iii & 317. (London: Scott, Greenwood & Son.)

Weights and measures; methods of analysis; fuels; water; raw materials; adulterants; fibrous raw materials; half-stuffs and their treatment; paper analysis and paper testing; sizes and weights of papers; paper trade customs.

- "Popular Chemical Dictionary." By C. T. Kingzett, F.I.C. Pp. vi & 368. (London: Bailliere, Tindall and Cox.) 12s. 6d. net.

- "Practical Leather Chemistry." By A. Harvey. Pp. viii & 207. (London: Crosby Lockwood & Son.) 15s. net.

Water analysis; analysis of lime, sodium and arsenic sulphides; estimation of nitrogen; analysis of lime liquors; limed pelt; lactic acid; other deliming agents; chrome liquors; single and double bath tanning; commercial egg yolk; soap analysis; oils, fats and waxes; tannin;

tan liquors ; leather analysis ; finishing materials ; natural dyestuffs ; coal tar dyes.

- “ Principles of Applied Electro-Chemistry, The.” By A. J. Allmand. (London : E. Arnold.) 1920 reprint of 1912 edition. 25s. net.

Part I. : General and theoretical. Part II. : Special and technical ; primary and secondary cells ; Cu, Ag, Au, Zn, Sn, Ni, Fe, Pb ; various ; electroplating and electrotyping ; hypochlorites and chlorites ; alkali chlorine cell ; other processes ; metals from fused electrolytes ; electrothermics in iron and steel industry ; calcium carbide and cyanamide ; other electrothermal products ; oxidation of atmospheric nitrogen.

- “ Profession of Chemistry, The.” By R. B. Pilcher. Pp. xiv & 199. (London : Constable & Co., Ltd.) 6s. 6d. net.

Preliminary education ; pharmacists and chemists ; professional training ; prospects and conditions of practice ; professional organisation ; public analysts and official agricultural analysts ; professional procedure ; industrial chemistry ; chemistry and the State ; teaching ; women in professional chemistry ; chemists in war.

- “ Service Chemistry, A Short Manual of Chemistry and Metallurgy and their Application in the Naval and Military Services.” By the late V. B. Lewis, F.I.C., and Prof. J. S. S. Brame, F.I.C. Fifth edition. (London : E. Arnold. 1920.) 21s. net.

- “ Special Reference to Oriental Oils.” By L. E. Laucks. Pp. viii & 138. (New York : J. Wiley & Sons, inc. London : Chapman and Hall, Ltd.) 6s. net.

Examination ; uses of oils ; sampling.

- “ Stereochemistry.” By Prof. A. W. Stewart. Second edition. Pp. xvi & 277. (London : Longman & Co.) 12s. 6d. net.

Section I. Stereoisomerism in carbon compounds, Part I. with optical activity, Part II. without optical activity ; Section II. Stereochemical problems into which isomerism does not enter.

- “ Treatise on Qualitative Analysis, A.” By Prof. F. Clowes, D.Sc., F.I.C., and J. B. Coleman, F.I.C. New edition. Pp. xvi & 400. (London : J. and A. Churchill.) 12s. 6d. net.

Apparatus and operations ; analytical operations ; analytical reactions ; reactions of the metals ; reactions of inorganic acid-radicles ; detection and reactions of organic substances ; systematic analytical course and tables ; properties and detection of gases ; analysis of liquids and solids.

- “ Zinc and its Alloys.” By Dr. T. E. Lones. Pp. ix & 127. (London : Sir I. Pitman & Sons, Ltd.) 2s. 6d. net.

Obituary.

THOMAS PEARSON KILNER CROSLAND died at Huddersfield on the 17th November, 1919, at the age of 32 years. Educated at Huddersfield College School, he received his training in chemistry at the Huddersfield Technical College, and subsequently attended special Courses in Colour Chemistry at the University of Leeds, working under Professor A. G. Perkin. He held an appointment as chemist with Read, Holliday & Sons, Ltd., for ten years before the works of the company were acquired by British Dyes, Limited, with whom he continued until his death, having at that time control over the manufacture of several important products, for which he designed and erected plants. He was also the patentee of two processes connected with dyeing, and, jointly with his brother, the late Major Crosland, D.S.O., of one connected with X-Ray photography.

FRANK BERNARD LAST, who died at Bournemouth on April 27th, in his 65th year, received his early training in chemistry under Mr. Edward Richards, F.I.C., of Barrow-in-Furness, and had been in practice as a public analyst and metallurgist in that town for several years prior to his election to the Fellowship of the Institute in 1888. In the same year he was engaged in the management of the Swansea Hematite Ore Company at Landore, South Wales. He was manager of these works, later known as "Baldwin's Ltd.," until he retired in 1904.

Changes in the Register.

At the meetings of the Council held on October 31st, November 28th, and December 19th, 1919, 10 new Fellows were elected; 1 Fellow was re-elected; 7 Associates were elected to the Fellowship; 72 Associates were elected; and 69 new Students were admitted and 1 re-admitted.

The Institute has lost 4 Fellows and 1 Associate by death.

The names of Fellows and Associates elected in January and February, 1920, will be notified in the next part of the Journal.

S. = Naval, Military, or Air Service. M. = Munitions.

I.I. = Passed the Intermediate Examination of the Institute.

New Fellows.

- Bayly, Percival George Wykeham, Commonwealth Steel Products Works, Waratah, N.S.W., Australia. [M.; Chief Chemist.]
- Binks, Frederick Nisbet, 5, East Avenue, Benton, Newcastle-on-Tyne. [Chief Analytical Chemist, Messrs. Brady and Martin.]
- Blagden, John William, M.A. (Cantab.), Ph.D. (Wurzburg), c/o Messrs. Howards & Sons, Ltd., Uphall Road, Ilford, Essex. [Research Chemist, Messrs. Howards & Sons; Researches and Patents.]
- Davies, Joseph, Sunnyside, Mount Road, Upton, Birkenhead, Cheshire. [Consulting Chemist; 30 years' experience.]
- Drummond, Jack Cecil, D.Sc. (Lond.), University College, Gower Street, London, W.C. 1. (Senior Physiological Chemist, Cancer Research Inst.; Research and Publications.)
- Johnson, John William Haigh, B.Sc. (Vict.), M.Sc. (Leeds), Rivers Board, Wakefield. [Chemist and Biologist, West Riding Rivers Board; Research.]
- Matthews, Donald John, c/o The Lawes Trust, Harpenden, Herts. [Chief Analyst; Researches and Publications.]
- Simmonds, Charles, B.Sc. (Lond.), The Government Laboratory, Clement's Inn Passage, London, W.C. 1. [Superintending Analyst, Govt. Lab.; Research and Publications.]
- Smith, James, 8, Inner Temple, Dale Street, Liverpool. [Consulting Chemist; over 20 years' experience.]

Wood, John Kerfoot, D.Sc. (Vict.), 31, Rowan Avenue, Brooklands, Cheshire.
[Lecturer in Physical Chemistry, Manchester College of Technology ;
Research and Publications.]

Fellow Re-elected.

Davis, Thomas H., 47, North Eleventh Street, Newark, N.J., U.S.A.

Associates Elected to Fellowship.

Amoore, Ronald Lewis, Maycroft, Erpingham Road, Putney Common,
London, S.W. 15.

Ogilvie, James Maclaren, B.Sc. (Edin.), Department of Colour Chemistry,
The University, College Road, Leeds.

Powney, William Edmund Francis, London County Council, Public Health
Department, 2, Savoy Hill, London, W.C. 2.

Robertson, Stewart, c/o Messrs. Bryant and May, Ltd., Bow, London, E. 3.

Schwarz, Theodor, Trutnov, Czechoslovakia.

Scott, Arthur William, A.C.G.I., 7, Riggindale Road, Streatham, London,
S.W. 16.

Tallantyre, Snow Blagburn, B.Sc., A.R.C.S. (Lond.), Research Laboratory,
Tar and Ammonia Products Works, Beckton, London, E. 16.

New Associates.

Arnall, Francis, B.Sc. (Lond.), South-Western Polytechnic Institute,
Chelsea, S.W. 3. [S. ; M.]

Auchinleck, Gilbert Graham, B.Sc. (McGill), Department of Agriculture,
Mauritius. [Agricultural Chemist ; Publications.]

Badger, Miss Louie Midgely, B.Sc. Tech. (Manc.), 10, Birch Grove, Dickenson
Road, Rusholme, Manchester. [Research.]

Bateman, Alfred Harry, B.Sc. (Lond.), 24, Westcombe Park Road, Black-
heath, London, S.E. [Chief Works Chemist.]

Becker, Henry Galvin, A.R.C.S.I., 15, York Road, Rathmines, Dublin.
[Research.]

Bell, Thomas Robert, B.Sc. (Dun.), 2, Marine Crescent, Hartlepool. [Teach-
ing.]

Berry, Robert Gordon, B.Sc. (Lond.), 14, York Road, Ilford, Essex. [S. ;
Croix de Guerre.]

Blair, James, B.Sc. (Leeds), 3, West Avenue, Garden Village, Levenshulme,
Manchester. [Dyes.]

Bull, Bertram Alfred, 14, North Road, West Bridgford, Nottingham.
[Univ. Coll., Nottingham ; 20 years' experience ; Research.]

Cheshire, Daniel, 11, Graeme Road, Enfield, Middlesex. [Royal Tech.
Inst., Salford ; M. ; Researches.]

Cockrane, John Robert Swan, B.Sc. (Melbourne), Cordite Factory, Maru-
byrnong, Victoria, Australia. [M.]

- Comber, Norman Mederson, B.Sc., A.R.C.S. (Lond.), Department of Agriculture, The University, Leeds. [S.]
- Crann, Thomas William, M.Sc. (Leeds), 17, Morritt Drive, Halton, nr. Leeds. [S. ; Research.]
- Crisp, Douglas Edward, B.Sc. (Lond.), 74, Derby Road, Ponders End, Middlesex. [M.]
- Cullinane, Nicholas M., M.Sc. (N.U.I.), 27, Michael Street, Waterford, Ireland. [Research.]
- Cutter, John Outram, B.Sc. (Wales), 6, Eliot Park, Lewisham, London, S.E. 13. [M.]
- Day, Frederick William Francis, The Research Laboratory, Rubber Growers' Association, Petaling, F.M.S. [Royal Coll. of Science ; S.W. Polytechnic ; Research.]
- East, Frederick John, Barrister-at-Law, Biddenden, Guest Road, Parkstone, Dorset. [Finsbury Tech. Coll. ; M.]
- Fowles, George, B.Sc. (Lond.), 79, Speldhurst Road, Bedford Park, London, W. 4. [S. ; Publications.]
- Garrod, Ralph Eddowes, M.A. (Cantab.), 5, College Gardens, Dulwich Village, London, S.E. 21. [Govt. Work ; Research.]
- Green, George Melling, M.Sc. (Liv.), Chemical Department, Technical College, Huddersfield. [S. ; Research.]
- Grounds, Arthur, B.Sc. Tech. (Manc.), Hill Top Cottage, Glossop, Derbyshire. [M. ; Research.]
- Harrison, Miss Florence Mary, 41, Lyndon Road, Olton, nr. Birmingham. [Nat. Sci. Tripos, Part II., Cantab. ; Research.]
- Heald, John Arthur, B.Sc. (Lond.), 5, Elmsmere Road, Fog Lane, Didsbury, Manchester. [S. ; M.C. ; Mentioned in Despatches.]
- Hendry, James, c/o Messrs. Bickford & Sons, Ltd., Manufacturing Chemists, Currie Street, Adelaide, Australia. [Heriot-Watt College, Edinburgh ; Adelaide Univ. ; S. ; M. ; Research.]
- Hill, John Campbell, B.Sc. (Dun.), Lifton House, Jesmond, Newcastle-on-Tyne. [S.]
- Hodgkinson, Samuel Edwards, 5, Taylor Street, Heaton Park, Manchester. [College of Technology, Manchester ; Research and Publications.]
- Holmes, Henry, A.R.C.S. (Lond.), Sunny Mount, Westdale Lane, Mapperley, Notts. [Research.]
- Hurren, Frederick Harold, The Rover Co., Ltd., Meteor Works, Coventry. [Northern Polytechnic ; Chief Chemist.]
- Imrie, Arthur Peter, A.R.T.C., 1, Lorne Terrace, Maryhill, Glasgow. [I.I. ; Research.]
- Jack, Andrew Keith, M.Sc. (Melbourne), Kilkerran, William Street, Brighton, Victoria, Australia. [M.]
- Kanga, Darab Dinsha, M.A. (Bombay), Elphinstone College, Bombay. [Research.]

- Kenny, Terence Charles, M.Sc. (Dub.), The Castle, Blackrock College, Co. Dublin, Ireland. [Demonstrator, Univ. Coll., Dublin.]
- Khan, Abdus Samad, B.Sc. (Calcutta), M.Sc. (Manc.), Patna College, Bankipore, B. & O., India. [Research.]
- Leslie, John, B.Sc. (Edin.), 6, Findhorn Place, Edinburgh. [M.]
- Littlewood, Ernest Alfred, A.M.S.T., 2, Brookfield Road, Crumpsall, Manchester. [Research.]
- Lochhead, Kenneth George, A.R.T.C., 23, Park Road, Rugby, Warwickshire. [I.I.; Works Chemist.]
- Loundes, Ashley Gordon, M.A. (Cantab.), Waverley, Cuckfield, Sussex, [M.; Research.]
- Mackenzie, Thomas, M.A., B.Sc. (Edin.), Coiltun Villa, Reay Street, Inverness. [M.; S.]
- Marsden, Herbert, B.Sc. (Manc.), Bramhall Cottage, Llanellian Road, Old Colwyn, N. Wales. [Research.]
- Moore, George Turpin, M.Sc. (Dun.), Milton House, 19, Neale Street, Roker, Sunderland. [Lecturer and Demonstrator, Armstrong College.]
- McKenzie, Tom Macindoe, Glasscocks, South Ockendon, Essex. [Royal Tech. Coll., Glasgow; over 15 years' experience.]
- McPolin, James, B.Sc., M.B., Ch.B. (N.U.I.), 7, Clifton Street, Belfast, Ireland. [S.]
- Neilson, Matthew, A.R.T.C., 21, Lauderdale Avenue, Earls Park, Newlands, Glasgow. [Lecturer and Demonstrator; Research.]
- Ogilvie, James Pettigrew, 2, St. Dunstan's Hill, London, E.C. 3. [Finsbury Tech. Coll. Certif.; M.]
- Ormerod, Oliver, B.Sc. (Vict.), The Poplars, Lower Bebington, nr. Birkenhead. [M.]
- Parrish, William John, B.Sc. (Lond.), 32, Lett Road, London, E. 15. [S.]
- Picken, James, B.Sc. (Glas.), 3, Yarrow Gardens, North Kelvinside, Glasgow. [M.]
- Pollard, Hubert Eugene, A.M.S.T., 8, Derby Road, Heaton Moor, Stockport. [S.]
- Price, Norman Jeredick, B.A. (Cantab.), Hollandhurst, Mount Pleasant, Bilston, Staffs. [M.; Research.]
- Rea, William George, A.R.C.S.I., 46, Windmill Street, Gravesend, Kent. [S.]
- Richards, Samuel William, B.Sc. (Lond.), Elginhurst, London Road, Knebworth. [M.]
- Roberts, Ellis Jones, B.Sc. (Wales), Dinorben, Abergele, N. Wales. [S.; Research.]
- Schwartz, Hyam, B.Sc. Tech. (Manc.), A.M.S.T., c/o The Lion Trading Co., 73, Chiswell Street, London, E.C. [M.; Research.]
- Schofield, Miss Charlotte Bean, M.Sc. (Dun.), The Retreat, Morpeth, Northumberland. [Demonstrator and Asst. Lecturer.]

- Shackleton, Fred., City Waste Pulling Co., Ross Works, Leeds Road, Bradford. [Bradford Tech. Coll. Dip. ; Dyes.]
- Short, Wallace Frank, M.Sc. (Vict.), 11, Brighton Grove, Rusholme, Manchester. [Research ; M.]
- Siderfin, Norman Edward, M.Sc. (Leeds), A.C.G.I., Holly Dale, Church Road, Forest Hill, London, S.E. 23. [Research ; M.]
- Spurling, Abraham Charles, St. Helen's, 6, Cleve Road, West Hampstead, London, N.W. 6. [King's College, London, and East London College ; M. ; 12 years' experience.]
- Stirling, Miss Elizabeth Brownsword, B.Sc. (Glas.), c/o Goldthorpe, 4, Exbury Road, Catford, London, S.E. 6. [Food.]
- Tavroges, Joseph, B.Sc. (Lond.), 137, Elizabeth Street, Hightown, Manchester. [Research.]
- Taylor, Charles William, A.R.C.S. (Lond.), Chesterfield Lodge, Old Mill Road, Torquay. [S.]
- Thomas, Lewis Edward, B.Sc. (Wales), Augerta, Elwy Street, Rhyl, N. Wales. [M.]
- Walker, Andrew Dykes, B.Sc. (Edin.), Bedford House, 7, Crooms Hill, Greenwich, London, S.E. [Govt. Lab.]
- Wilkinson, Edward John, 16, Hanover Gardens, Higher Broughton, Manchester. [Yorkshire College—now Leeds University ; 20 years, experience ; Research ; Dyes.]
- Williams, Vernon Harcourt, B.Sc. (Wales), 31, South Beach Avenue, Ardrossan, Ayrshire. [M. ; Research.]
- Wilson, Alan Forsyth, B.Sc. (Dun.), 2, Burdon Place, Newcastle-on-Tyne. [S.]
- Wilson, James Herbert, 40, Western Road, Cowlersley, Huddersfield. [Manchester Coll. of Tech. ; Dyes ; Research.]
- Wilson, Stanley Pierce, M.Sc. Tech. (Manc.), Heald House, Rusholme, Manchester. [S.]
- Withers, John Charles, Ph.D. (Wurzburg), 76, Larkhall Rise, Clapham, London, S.W. 14. [Finsbury Tech. Coll. Dip. ; Lecturer and Demonstrator.]
- Wolff, Lewis Smaje, B.Sc. (Lond.), 64, Morpeth Street, Hull. [S.]
- Wootton, Fred., B.Sc. (Lond.), Dudley Road, Ashford, Middlesex. [S. ; Research.]

Corrigendum.—In the List of new Associates published in Proceedings, Part IV., 1919, Mr. W. Mark Hampton, A.I.C., should have been described as *Research* Chemist instead of Works' Chemist.

New Students.

- Allibone, Bernard Charles, Chevet Lane, Sandal, Wakefield.
 Anderson, Alexander Ross, Alexander Cottage, Uddingston, Lanarkshire.
 Appleyard, Frederick Norman, 77, College Road, Bradford.
 Banks, Bernard George, 46, Montalt Road, Woodford Green, Essex.
 Bannister, Cyril Bradley, 126, Halifax Road, Brighouse, Yorks.
 Bartlett, Cecil Atley, 71, Salisbury Road, Harrow, Middlesex.
 Bates, William Ralph, Silverdale House, Silverdale, Stoke-on-Trent.
 Biggs, George Henry, Mortlake, 15, Leeds Road, Seven Kings, Essex.
 Bovill, Percy James Clarke, Millandreath, Pentire, Newquay, Cornwall.
 Bowen, Arthur Riley, Avondale, 63, Bromyard Road, Worcester.
 Chaplin, Rufus, Gipping House, Newton Road, Stowmarket.
 Chapman, Mrs. Lillian Georgina, 15, Carlyle Mansions, Cheyne Walk,
 Chelsea, London, S.W. 3.
 Clear, Harry Norman, Treskerby, Curtis Road, Hornchurch, Essex.
 Coomber, Henry Edward, 179, Ditchling Road, Brighton, Sussex.
 Cuckney, Malcolm, 22, Clements Road, Ilford, Essex.
 Dallimore, Thomas Warwick, 33, Trafalgar Road, Greenwich, London,
 S.E. 10.
 Dodman, Stanley Boone, 26, Bloomsbury Square, London, W.C. 1.
 Ellison, Charles Herbert, 13, Hodder Street, Accrington, Lanes.
 Falconer, William Alexander, c/o Mrs. Walker, 125, North John Street,
 Glasgow.
 Foster, Frank, Station Road, Brockholes, Huddersfield.
 Geary, William, 7, East Park Avenue, Hull.
 Giles, John Kenneth, Hillcrest, Arkley Barnet, Herts.
 Golding, William Ernest, 167, Monega Road, Forest Gate, London, E. 7.
 Gray, Kenneth Washington, Benclough, Harpenden, Herts.
 Hall, George Frederick, 7, Cambria Street, Nottingham.
 Hansford, Mitchell Harold, 68, Brantfell Road, Blackburn.
 Harrison, Douglas Creese, 18, Church Crescent, Muswell Hill, London, N. 10.
 Hinchliffe, Frederick, 5, Richmond Avenue, Prestwich, Manchester.
 Hugill, William, 5, Falmouth Road, Abbeydale, Sheffield.
 Hyde, Claudius George, Caddington, Luton.
 Jamieson, Archibald Robert, 30, Canal Street, Renfrew, Scotland.
 Jarrett, Walter George, 15, Wenlock Road, Handsworth, Birmingham.
 Jarvis, Alfred James, 166, Grove Street, Liverpool.
 Joseph, James Dillwyn, 7, Bainbridge Street, Rose Grove, Stockport Road,
 Manchester.
 Kipping, Norman Victor, Chalcots, 41, Roxburgh Park, Harrow-on-the-
 Hill.
 Laing, Thomas Edward, Haselmere, 26, Albion Grove, London, N. 1.
 Linnell, Wilfred Herbert, 12, Highbury, Monkseaton, Whitley Bay,
 Northumberland.

- Lipscomb, Alfred George James, San Kara, Osmaston Park Road, Derby.
 Macleod, Hector Alexander, Finlay Drive, Dennistoun, Glasgow.
 McGregor, James Hutchison, Cedar Cottage, Middleton Street, Alexandria, Scotland.
 Middleton, Charles Craib, 35, Randolph Road, Stirling.
 Montfort, Edward, 282, Mitcham Road, Tooting, London, S.W. 17.
 Mountford, Harry, 2, Highfield Road, West Bridgford, Notts.
 Myers, Charles Frederick, The Gables, Mount Outlane, Huddersfield.
 Neill, William Robertson, 60, Ardrossan Road, Salteoats, Ayrshire.
 Painton, William George, 17, Marlborough Road, Gunnersbury, London, W. 4.
 Pollard, Robert, 34, Albion Road, New Mills, Stockport.
 Powell, Walter James, 78, Forthbridge Road, Clapham Common, London, S.W. 11.
 Price, Charles Harold, 34, Empress Avenue, Woodford Green, Essex.
 Prince, Alfred John, 49, Longbridge Road, New Barking, Essex.
 Regnart, Horatio Clare, 33, Eskdale Terrace, Jesmond, Newcastle-on-Tyne.
 Scarlett, Miss Olive Worth, B.Sc. (Edin.), 204, Newhaven Road, Leith.
 Shiels, Douglas Oswald, B.Sc. (Melbourne), 38, Lisson Grove, Hawthorn Melbourne, Australia.
 Simpson, Miss Mary Constance, 2, Omelie Terrace, Joppa, Edinburgh.
 Smith, Donald Alford, 138, Portway, West Ham, London, E. 15.
 Smith, George Stanley, Central Y.M.C.A. Hut, Tottenham Court Road, London, W. 1.
 Taylor, Harold, 16, Bristol Road, Leeds.
 Thom, George Victor, c/o Mackay, 15, Barclay Place, Edinburgh.
 Thompson, William Andrew, 5, Patrick Road, West Bridgford, Notts.
 Thornton, Arthur James Edward, 38, Battersea Park Road, London, S.W. 11.
 Wallis, Kenneth, Thorpe Close, Long Eaton, Notts.
 Watson, Robert, Stuartville, Craigmore, Bute, Scotland.
 Webb, Kenneth Frederick, Government Laboratories, Box 286, Bloemfontein, S. Africa.
 Weeks, Edward Joseph, 62, Forest Hill Road, East Dulwich, London, S.E. 22.
 Wightman, Wilfred Alan, 1, Firsby Road, Stamford Hill, London, N. 16.
 Wilford, Arthur Thomas, 102, Denmark Road, London, S.E. 5.
 Wilkie, John, Muiredge Terrace, Baillieston, Glasgow.
 Willcox, Cyril Mason, 4, Worple Avenue, Wimbledon, London, S.W. 19.
 Williams, George Leslie Brandon, 2, Warkworth Villas, Cambridge.

Student Re-Admitted.

- Sewell, John, 166, Victoria Street, London, S.W. 1.

CHANGE OF NAME.**Associates.**

Morris Cohen to Maurice Deloisne Curwen.
 Richard Theodore Bruckman to Brookman.

DEATHS.**Fellows.**

Philip Anderson Estcourt.
 David Basil Hewitt, L.R.C.P.I., L.R.C.S.I., J.P.
 Frank Bernard Last.
 Edward Nicholson, Lieut.-Colonel, M.R.C.S.

Associate.

Thomas Pearson Kilner Crosland.

CORRECTIONS FOR REGISTER.

The following entries should be amended as under :—

Fellows.

Chapman, Alfred Chaston, add *Œ.* 1919.
 Gibson, Prof. Charles Stanley, O.B.E., M.A. (Cantab.), B.Sc. (Oxon), M.Sc.
 Tech. (Manc.).
 Raper, Henry Stanley, C.B.E., D.Sc. (Leeds), M.B., Ch.B. (Leeds). (Lieut.-
 Colonel, R.E.).

Associates.

Perry, Guy Allan, B.A. (Cantab.).
 Zilva, Sylvester Solomon, D.Sc. (Lond.), Ph.D. (Giessen).

General Notices.

Examinations.—The Council give notice that Examinations will commence on April 12th. The list of candidates will be closed on Monday, February 23rd, 1920.

Notice to Associates.—Associates elected prior to February, 1917, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain forms of application for election to the Fellowship.

Appointments Register.—A Register of Fellows and Associates of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

The Library.—The Library is open for the use of Fellows, Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays: 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is likewise open for the use of Fellows and Associates of the Institute, the hours of opening being from 10 a.m. to 9 p.m.; and on Saturdays from 10 a.m. to 5 p.m.

THE
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OF
GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.

1920.

PART II.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER.

Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.

April, 1920.

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(b) **Metallurgical Chemistry :** CECIL HENRY DESCH, Ph.D., D.Sc.

(c) **Physical Chemistry :** JOSEPH EDWARD COATES, O.B.E., D.Sc.

(d) **Organic Chemistry :** JOCELYN FIELD THORPE, C.B.E., F.R.S.

(e) **The Chemistry (and Microscopy) of Food and Drugs, Fertilisers and Feeding Stuffs, Soils and Water :** BERNARD DYER, D.Sc.

Therapeutics, Pharmacology, and Microscopy : FREDERICK GOWLAND HOPKINS, D.Sc., M.B., F.R.S.

(f) **Biological Chemistry, Bacteriology, Fermentation, and Enzyme Action :** ARTHUR HARDEN, D.Sc., Ph.D., F.R.S.

HON. AUDITORS :

JAMES CONNAH, B.Sc., and HENRY DROOP RICHMOND.

AUDITOR :

DAVID HENDERSON, Chartered Accountant.

REGISTRAR AND SECRETARY :

RICHARD BERTRAM PILCHER, O.B.E.

ASSISTANT SECRETARY :

GEORGE STANLEY WITHERS MARLOW, B.Sc., F.I.C.

Forty-Second Annual General Meeting.

MONDAY, MARCH 1st, 1920.

The forty-second Annual General Meeting of the Institute of Chemistry of Great Britain and Ireland was held at 30, Russell Square, London, W.C., on Monday, March 1st, 1920, at 4.30 p.m.

Mr. E. W. Voelcker, Hon. Treasurer, expressed his great regret that the President, Sir Herbert Jackson, was too unwell to be present. He moved "That Sir Robert Robertson, Vice-President, take the chair."

Mr. George Stubbs having seconded the motion, it was put to the meeting and carried.

Sir Robert Robertson thereupon took the chair.

The minutes of the forty-first Annual General Meeting having been read and confirmed, Mr. Edward William Voelcker, Hon. Treasurer, moved :—"That the Financial Statements for the year 1919 be received and adopted, and that a vote of thanks be accorded to the Auditors for their services."

The Treasurer said that as the Report of the Council dealt with the accounts in some detail, it would not be necessary to detain the meeting with any lengthy explanation. It was clear that the present income of the Institute left a very small margin ; and, as a matter of fact, the expenditure for the past year was in excess of the income, due to items which should be regarded as extraordinary expenditure. He hoped that, by careful regulation of printing bills and such matters, the expenditure in future would be kept within the income. Printing during 1919 cost £538 compared with £370 in 1918. In the present year it would be heavier, as the Journal would be issued in six parts instead of four, and with increased membership more copies would be required. He thought no one would now question the necessity for raising the subscription ; but the Council and Finance Committee were anxious not to make a further increase, although the value of money was going down and the price of everything going up.

Many Members would recollect that when the old premises in Bloomsbury Square were acquired provision was made for a lease and building

redemption fund. Policies were taken out under which, by payment of a moderate annual premium, the Institute recovered a sum of £3,755 at the expiry of the old lease. The present building was not freehold property and therefore, in a sense, it was a wasting security, because at the end of the lease the building would not belong to the Institute. He thought, and the Finance Committee agreed, that it would be a good policy to place a certain sum every year to reserve so that at the end of ninety years, although it would not benefit those present directly, the Institute would have a substantial capital sum in hand. The Committee found that by an expenditure of less than £120 per annum * they could secure the sum of £50,000 in ninety years, while if at any time during that ninety years the Institute did not want to continue the policy it could be given up at its surrender value. Another plan would have been to set aside all entrance fees and, of course, life compositions, as had been done in the past, at compound interest; but the income from those investments was necessary for the work of the Institute, though unfortunately it was taxed at 6s. in the pound. He thought it very unfair that although the Institute did not have to pay income tax on the Members' subscriptions, if those subscriptions were compounded the Institute had to pay the tax on the dividends derived from the investment. The investment of a portion of the entrance fees which would ordinarily be placed to Reserve Account for emergencies might, he considered, be very well applied to the Redemption Fund. He would remind the Members also that the Institute had contingent legacies amounting to about £6,000 to accrue to its funds some time in the future.

Returning to the accounts, he pointed out that in the past year a sum of £4,465 12s. 5d. was received in subscriptions from Fellows, Associates and Students, a considerable increase on the amount received in 1918. Dividends and interest amounted to £273 19s. compared with £188 14s. The other items on the receipt side remained very much the same, except that life compositions amounted to £2,722 compared with only £215 5s. Of that sum £2,684 had been invested, and it was the intention of the Council to complete the full investment of all life compositions received to date.

On the expenditure side the item of "printing, stationery, and office books" showed a considerable increase over that of 1918; the printing bill was £538, compared with £370, or nearly £170 more than in 1918. The item for rates and taxes looked large, but it was explained in the Report of Council that the sum of £153 belonged to the account of the previous year and a small sum had been paid in advance for 1920. The other item which showed a marked increase was the amount for salaries, wages, etc., £2,200. That was an absolute necessity. The staff had been increased because there was more work. An Assistant Secretary had been appointed, and there had been increases in salaries. Of the other items "apparatus and materials" was higher, due to the re-equipment of the laboratories. It was proposed to close the Building Fund Account as soon as possible. The Treasurer hoped that nobody would neglect to send a contribution on that account, because the list would not be published until outstanding promises were received. When it was closed any deficit would fall upon the General Account, and that amount in any case would be far less than the amount authorised to be spent on the building by the Institute in General Meeting.

* The amount of the Annual Premium will be £110 8s. 4d.

Sir Robert Robertson said that, before calling for a seconder, he would like to remark that the Institute was much indebted to the Treasurer for the care which he took with its finances. Those who met him at the Council table were well acquainted with the wide view and the ability which he applied to the affairs of the Institute.

Dr. McGowan, in seconding the resolution and the vote of thanks, said that he could not help feeling that the Treasurer had had a very onerous task during the past year, and would probably have for some years to come. They were very grateful to him and also to the Auditors for their work.

Mr. G. Watson Gray drew attention to the circumstance that on page 22 the comparative figures for 1918 indicating the excess of assets over liabilities had been misplaced in printing.

Mr. H. Droop Richmond having raised several questions with regard to the amounts for various items both in the General Account and the Building Fund, to which the Treasurer replied, asked for details of the cost of publications sold and the expense incurred by the Appointments Register.

The Registrar explained that the publications (*i.e.*, Lectures and Proceedings) were from stock.

The Treasurer said that it would be a little difficult to separate exactly the cost of maintaining the Appointments Register; it was very largely postage and stationery; but he would inquire into the matter (see p. 107).

Mr. Richmond having remarked that he noticed "Donations" on both sides of the General Account, the Treasurer said that he could say little about the donations received, except to thank the donors; the sum of £46 on the other side comprised £25 to the Library of the Chemical Society, £10 10s. to the memorial to the late Colonel E. F. Harrison, and £10 10s. to the Conjoint Board of Scientific Societies.

Mr. Richmond said that he was especially pleased that the Council proposed to start a Redemption Fund. He suggested that the proceeds of the former Redemption Fund should be applied to the Building Fund, but apparently it had not been carried to that fund.

The Registrar replied that it had been invested for the General Account from which it had been derived, but in effect it would be utilised to make up the deficit on the Building Fund. A special General Meeting of the Institute had authorised the Council to apply a similar sum to the Building Fund should they find it necessary to do so.*

The motion for the adoption of the Accounts and for the

* At an Extraordinary General Meeting of the Institute, held at 30, Bloomsbury Square, on June 18th, 1913, the Council were empowered to transfer, if and when they deemed it necessary, a sum not exceeding £3,500 from the General Funds of the Institute to the Building Fund of the Institute, and to apply such sum or any part of it in the erection and equipment of buildings for the use of the Institute.

vote of thanks to the Auditors was then put to the meeting and carried unanimously.

The Chairman nominated Mr. Herbert F. Stephenson and the meeting nominated Mr. H. Shankster as Scrutineers to examine the votes for the election of the Officers and Council.

The ballot for the election of the Censors having been taken, the voting papers for such election were also referred to the Scrutineers.

The Chairman said that the President had sent a copy of the notes for his address, which he proposed to read, with the permission of the meeting (see p. 91).

At the conclusion, the Chairman moved, Sir James Dobbie seconded, "That the Report of Council be received and adopted."

Sir James Dobbie expressed his great regret that the President was not able to attend the meeting, and he was sure that all present would deplore the cause of his absence. The address covered a wide field, and there were in it many topics of interest to which he would like to refer. The first was with regard to the work of the Nominations and Examinations Committee. It would be difficult for the Members to express adequately their gratitude towards that Committee for the Herculean task which they had undertaken and which they had now almost accomplished. The great bulk of the arrears which weighed heavily on the minds of many members of the Committee had been at last worked off.

He would also like to say a word in connection with the concluding part of the President's Address, in which he referred to the subject of the education of the chemist. The question at the present time was one of the utmost practical difficulty. The opportunity for chemists was greater than that they had enjoyed before, but the fulfilling of the task which was put upon the Universities and Colleges was extremely difficult. All the schools were crowded with students; the accommodation was inadequate, the number of teachers was inadequate, and those who had given most thought to the question saw no way in which they could compensate for the want of accommodation and the lack of teachers. He feared that the teaching would inevitably suffer to some extent, but it would not suffer through any want of effort or want of determination on the part of the teachers, because the spirit amongst them was excellent, and he knew their determination to rise to the occasion. Nothing could be more gratifying than the fact that so many young men were now seeking chemistry as a profession. Nothing could show more clearly that the country had been now aroused to the part which the chemist had to play in the industries of the country. Sir James concurred with the President in his appreciation of the services of the

Registrar and of the Assistant Secretary. He was sure that the Members were grateful that the President, although confined to the house through illness, had sent them the admirable address to which they had listened.

The Chairman then remarked that the Report was open for discussion.

Mr. Richmond said that he would like to add his tribute to the work of the Registrar. The Report referred to the publication of the list of members after an interval of five years. He suggested that the Institute should combine with other societies in the production of a joint chemical directory. If chemists could have one list for a number of societies it would be a matter of great convenience, and the expense would be correspondingly reduced, being shared between a number of bodies. The Journal was certainly an improvement upon its predecessor, but it seemed to have been conducted, not exactly in competition with, but having in view certain other journals. Perhaps it would be possible to approach the various chemical societies and ultimately have, if not one large society embracing the whole chemical industry, at any rate, societies working very much together. During the war the Government had turned to the Institute and to a number of other societies and individuals, but there was no single chemical body to which the Government could turn for chemical information. The Council should bear in mind the possibility of working very much in conjunction with the other chemical societies, as it would be a great advantage. These societies were not antagonistic to one another, but each supplemented the work of the other, and it should be possible to do something in the way he had suggested. He then referred to the Appointments Register, suggesting that the work involved should be undertaken by the Labour Exchanges of the Board of Trade. He referred also to the laboratories, and asked the Council to consider the feasibility of sub-letting portions of the building.

The Chairman assured the members that the Council would take into serious consideration the points submitted. Taking the last one first, he mentioned that the laboratories had been in point of fact offered to Colleges. With regard to the list of members, while the Council were equally impressed with the idea of the unification of the profession, there were certain differences which will no doubt appeal to the members, one being that in the case of the list of members of the Institute it was a "register" as well as a list. With regard to the Journal and possible overlapping, that would also be considered, but he thought that the Council minded their own business pretty much in the Journal and commented on matters from their own special point of view. They had always been rather proud of the Appointments Register (hear, hear), and he had observed in the Press that employers were finding that the very last place where they sought certain classes of workers was the Labour Exchange.

Dr. Morris Travers criticised the Journal and Proceedings, in which he remarked that much was said that led to no definite conclusion. He referred to passages dealing with income tax, the remuneration of chemists, and the conditions attaching to their appointments.

The Registrar explained that the pages referring to remuneration consisted of abstracts prepared from the returns received from Members in answer to a circular.

Dr. Travers also criticised the report of the Glass Research Committee (pp. 25—26 of the Journal, Part I., 1920). Some of the statements were

dangerous and inconclusive. He thought the members did not look for indefinite accounts and discussions, but for conclusions that had been arrived at. When conclusions were given, the data supporting them should also be given.

The Chairman said that once more he had to regret that the President was not present, especially to deal with the question of glass; but he had no doubt that he agreed with any conclusions, if there should be any, in the article to which Dr. Travers referred. The matter on page 26 was, he submitted, not so condemnatory of British wares as Dr. Travers would lead the Members to suppose. Several of the statements were decidedly favourable.

Dr. O. L. Brady, speaking on the Report, said that he disagreed *in toto* with Mr. Richmond. First of all, with regard to the Register, it was not a list of members and had not been described as such; it was described as the Register of the Institute of Chemistry. Mr. Richmond had suggested that the Institute should allow the members' names to appear in a list with the members of all the chemical bodies, whether qualified chemists or not. The Register was a definite list of chemists whom the Institute considered to be qualified. The question of the overlapping of the Journal was admittedly a serious one, and it was a matter to which very considerable attention had been given during the past twelve months. The Journal was supposed to represent the views of the Council of the Institute and of the members of the Institute—that is, of qualified chemists. Occasionally the views of the Council or of the members of the Institute were at variance with the views of other bodies. That was the difficulty, because it was obvious that a responsible body like the Institute ought to have freedom of expression in its own publication. He hoped it would show the interest of the Council and members, and give an opportunity for discussion on matters affecting the interests of chemists in the widest possible sense. It was not proposed to publish original scientific and technical papers. If overlapping with other journals occurred it was for them to decide what was their own domain. The next point raised by Mr. Richmond was the necessity for having one central body to which all chemical questions could be referred by the Government. About twelve months ago a body of that nature, the Federal Council of Chemical Societies, was formed, on which this Institute was represented. Dr. Brady's personal view was that the Federal Council was not quite as active as it might be; at all events it had been formed by the various societies, and the Institute was ready to support it. With regard to the Appointments Register, Mr. Richmond made the extraordinary suggestion that the Institute should hand over to clerks absolutely unacquainted with chemistry the finding of appointments for chemists. Could there ever be a more unfortunate thing for the chemists in this country than to hand over this work to persons absolutely ignorant of chemical applications? With regard to Dr. Travers' criticism, the Registrar had stated that the passages to which attention had been drawn were merely an abstract of the returns and expressions of opinion of the various members who sent in replies to a circular which was sent out by the Institute. The question of the legal position of chemists in whole-time appointments was a matter that had been before the Council recently, and there was an instruction to the new Council to consider the advisability of appointing a Legal and Parliamentary Committee to go into that question. With regard to the comments on the Report of the Glass Research Committee he (Dr.

Brady) regretted that he was not very competent to deal with that, and that the President was not with them to do so, but he thought Dr. Travers would realise that there was a very great divergence of opinion in connection with the quality of British glass, and he was certain that the Glass Research Committee had had great difficulty in collecting together the information for making any statement at all from the point of view of the user, who, after all, was entitled to his opinion. Among his friends a dozen would say that British glass was very good, and a dozen that it was no good at all. He did not think anything had appeared which was particularly offensive to the British glass manufacturers; it was fairly critical, but no very definite decision had been arrived at, because it was very difficult to arrive at decisions in that matter. As to British test tubes, his own personal experience was most unsatisfactory (hear, hear).

Mr. E. M. Hawkins referred to Mr. Richmond's remarks with regard to the use of the laboratories, pointing out that a very large number of Associates would eventually present themselves for examination for the Fellowship, for which the laboratories would be required.

The resolution for the adoption of the Report was put to the meeting and carried unanimously.

The Chairman then declared that the Scrutineers had reported that those whose names were on the balloting list as issued had been duly elected, and that the Censors elected were Mr. Alfred Chaston Chapman, Sir James Dobbie, Dr. Bernard Dyer, and Dr. Percy F. Frankland.

The meeting proceeded to the election of the Auditors.

Mr. Connah, having expressed his willingness to continue in office, was re-elected; but, as Dr. Thorne had expressed his wish to retire, Mr. William Macnab moved, Dr. Forster seconded, and it was resolved that Mr. H. Droop Richmond be elected to the vacancy.

On the motion of the Hon. Treasurer, Mr. David Henderson, chartered accountant, was reappointed Auditor at a remuneration of fifteen guineas.

The Chairman suggested that the meeting should forward a note to Sir Herbert Jackson, asking his consent to the publication of his address, and expressing regret that he had not been able to attend, and sympathy with him in his illness. He read a note received shortly before the meeting in which the President said: "If I am unable to leave home, will you say on my behalf how much I regret being absent on an occasion when I think any President of the

Institute could say that the outlook for the professional body of chemists is probably better and fuller of promising utility to its members than at any period of its existence. If all that is demanded or expected of it by some of its members cannot be immediately realised, there is no doubt that the Institute is alive and fully determined to carry out the functions of the representative body of chemists. But its aims are high, and, while it accepts the responsibility of safeguarding the interests of its members, through its exceptionally representative Council, and now because of its valuable Local Sections, it must be the judge of what truly are the best interests of chemists as professional men ultimately depending on their own ability and self-reliance, while looking to the Institute for expressing their views and ambitions, maintaining their rights and insisting on their due scientific and professional status." The Chairman moved that a message be sent to the President asking him to allow the publication of his address and expressing their regret at his illness.

The motion was carried unanimously.

On the motion of Mr. A. Chaston Chapman it was unanimously resolved "That the thanks of the Members be accorded to Sir Robert Robertson for the tactful and courteous way in which he has fulfilled his duties in the chair."

. On the motion of Mr. William Marshall, seconded by Mr. Lantsberry, a vote of thanks was accorded to the retiring Members of the Council for their services.

The Chairman having returned thanks for the retiring Officers and Members of the Council, the meeting terminated.

The President's Address.

MARCH 1st, 1920.

SIR HERBERT JACKSON, K.B.E., F.R.S.

I think I may say of the Council that, as they indicate in the opening sentence of their Report, the past year has been for them a year of great activity, and I would remark at the outset that your Council has worked hard and without regard to sacrifice of their time and energy in the general interest.

The roll of Membership and Studentship has increased, and we welcome to our ranks many good chemists who will strengthen the Institute by giving their support to its endeavours for the advancement of our profession.

At the same time we have to deplore the loss by death of many valued members, to some of whom I would like to pay a brief tribute.

Prof. Adrian John Brown, Past President of the Institute of Brewing, whose name is to be associated with the Chair of Brewing in the University of Birmingham, was our Examiner in Biological Chemistry from 1901—06, and served on the Council from 1906—09. A man of singular personal charm, he will long be remembered among chemists and others connected with the industry of brewing.

Sir William Crookes, Past President of the Royal Society, an Original Fellow of the Institute, and a Member of its first Council, was one of the remarkable group of chemists who studied under Hofmann at the Royal College of Chemistry. His name stands out prominently among British chemists who have added much to the prestige of their country by a record of valuable original work and important discoveries. He will be remembered by all of us with pride in his life-long and successful devotion to science, and with affection by those of us who enjoyed his friendship.

Mr. Thomas Fairley, Past President of the Society of Public Analysts, a Past Examiner for the Institute, Member of Council and Vice-President, was held in high esteem among the Fellows, especially those practising in his own branch of work.

In the death of Dr. Harold Cecil Greenwood we deplore the loss of a young chemist of exceptional promise, whose name is associated with research on the fixation of nitrogen and on problems in physical chemistry.

Among older members I would mention Mr. Sidney Harvey, Public Analyst, Dr. David Basil Hewitt, a Member of the Council for two periods, whose name was associated with the alkali industry, Mr. Francis Edward Lott, an Original Fellow, and well known as a consultant in the brewing industry, and Dr. Robert Sydney Marsden, a well-trained chemist who subsequently turned his attention to medicine and was for many years Medical Officer of Health for Birkenhead.

The name of Sir Boverton Redwood, who was a Member of Council for no less than four periods and was also a Vice-President, will always be associated with the development of the science and industry of petroleum. He rose to distinction and honour by his services to the State.

I will take this opportunity also to refer to two other Fellows whom we have lost since the publication of the Report—Mr. Charles Edward Groves, another of Hofmann's students, an Original Fellow, the first Secretary of the Institute, Registrar and Secretary from 1887—92, and a Vice-President from 1892—95, who maintained his keen interest in our affairs until the end; and Mr. Walter William Fisher, a Past President of the Society of Public Analysts, an Examiner for the Institute in the Chemistry of Food and Drugs, and a Member of the Council for three periods.

The Financial Statements which the Honorary Treasurer has submitted to you do not fall specially within my purview as President, but I would like to say that the Institute is deeply indebted to the Hon. Treasurer and Finance Committee

for their services. They have a difficult task in their endeavour to provide for the developments determined by the Council, and at the same time to keep our expenditure within our income. We can rest assured, however, that our affairs are in safe hands, and we may anticipate that, when once we have met the expense of our present work of reconstruction—involving new Regulations and new By-laws, with the consequent printing and legal expenses—we shall have less difficulty in financial matters.

The Report states that the Building Fund will be closed at this date, but I would like to say that there is yet time for any Fellow or Associate who has not yet forwarded a subscription to add his name to the list of contributors, which will be published in due course. We are grateful to all who have helped us to provide the Institute with these excellent premises.

The General Purposes Committee have the revision of the By-laws in hand, and the work is advanced to the extent that copies, embodying as far as possible the views of Local Sections and Honorary Corresponding Secretaries, have now been forwarded to the solicitors for submission to Counsel. We hope, in the course of this or next month, to send them to the Privy Council, whose approval is necessary before they are formally adopted by the general body.

The General Purposes Committee have also dealt with many questions affecting the professional interests of the members. Although it may not strictly fall to the Institute under its Charter to take an active part in the prevailing efforts on the part of professional men to maintain their financial position in the light of present conditions, our Proceedings have repeatedly shown that the Council and the General Purposes Committee are not unmindful of the urgent necessity of giving our members useful information on this pressing question. The suggestion of the London and South Eastern Counties Section that we should endeavour to obtain some authoritative pay statistics has resulted in the publication of a report which I think should be useful both to chemists and

their employers. I will not say that the figures disclosed are satisfactory, but I think these figures and the information accompanying them show very clearly how difficult it would be to formulate any scale of pay for qualified professional men practising under such varied conditions. In my opinion the figures cannot be taken as a reliable guide of the true position, not only because it is obvious that many of the more prosperous members have made no return, but also because the returns were received during a very unsettled period.

One thing is certain, that whatever success may attend the efforts of other bodies to secure a minimum rate of pay, no chemist will consent to any graded rate of pay which might have the effect of limiting his prospects. Without adopting the functions of a trades union we can all take a part in helping one another; and especially we must look to those members who occupy controlling positions to secure, so far as they are able, the appointment of competent assistants and to promote their interests according to their deserts. I believe that the general position is improving, and that leaders of industry and government and other authorities who have the assistance of chemists are becoming more and more alive to the necessity and the wisdom of making the appointments which they have to offer more attractive to the best qualified men and women.

Although I will not say that the complaints with regard to the poor remuneration of chemists, of which we have heard so much in the past, have been in any way exaggerated, I believe that they have, to a considerable extent, referred to those who either have not become fully qualified or, if qualified, have not bestirred themselves sufficiently in their own interests. There is, however, the fact that, before the war, opportunities were fewer, and that some official appointments were offered on inadequate and unsatisfactory terms and conditions. Yet some men were better equipped than others to take advantage of such opportunities as came their way.

Again, although I strongly deprecate any system which does not attract the best possible service to industry and to the State, I am aware that many in positions financially

unsatisfactory have gained valuable experience which they have subsequently turned to good and profitable account. I am far from defending those who seek chemists at inadequate salaries; we must regard the salary offered to some extent as an indication of the type of man they intend to attract. If a good chemist, from the force of circumstances, is obliged to accept a poorly paid appointment, we must endeavour to help him to do better elsewhere, if, through the nature of his duties, there is no opportunity given to him of proving his higher worth as a fully trained and qualified man of science. In any event, we will do our best through the Appointments Register to place all our members as advantageously as possible. That is the practical issue, and I may say that several hundred members of the Institute are in a position to acknowledge that this part of our work has been of direct benefit to them. To my knowledge the Appointments Register has been of most valuable service, and I think you will agree with me that since the success of the profession must depend on its being fully employed, we should spare no reasonable effort in this direction.

Objections have been raised to giving figures as to the number of chemists available for appointments; but I can tell you that our records show that over 530 chemists, *i.e.*, a number equal to more than one-sixth of the Institute, who have had their names on our books since the Armistice, are not now needing our assistance in this way. So far as we are able to ascertain, there are not more than thirty members actually without appointment to-day, *i.e.*, less than 1 per cent.

Fellows and Associates will recollect that, early in 1919, the Council formulated suggestions for a Government Chemical Service, and I am able to announce that we have been assured that the representation made to the authorities in this matter has not been forgotten, but forms part of more general questions which have been under the consideration of the Government and call for careful and lengthy deliberation. Further, we are assured that, should occasion arise, our offer of assistance in the consideration of the matter will be gladly accepted.

I think it well that this subject of remuneration has been kept before you, and I am confident that the discussion of it is for your benefit. Solicitors, medical men, architects, and other professional men have been obliged to recognise, as we have done, the necessity for reviewing their position : so that we are not alone in calling upon our members to uphold their just claims for an adequate return for their services. I would urge you, however, to consider seriously the importance of looking to results from individual effort, quite apart from any organised effort, having regard to the fact that the chemist, using the word as applied to a man of high scientific attainments, is not an ordinary craftsman, but an educated man who should be in a position to command the respect and esteem of all with whom he becomes associated both in business and in social life.

Our conferences with the Ministry of Labour have been followed up by correspondence with many of the Industrial Councils under the Whitley Scheme, whereby the work of chemists and of the Institute has been brought to the notice of these bodies with a view to our co-operation with them in the interests of scientific industrial development. I may mention in this connection that a number of our Fellows are associated with these bodies, either as representatives of employers or as officials, and I am sure that where this is the case the claims of chemistry will not be ignored.

The Whitley Councils should consist of the best representatives that can be found both of employers and employees, and should certainly include men with the highest technical knowledge of the operations involved in the industries concerned ; but, while the originators of the Whitley Scheme are fully alive to the prospect of making increasing use of science, they have, so far, in the majority of cases found no means of co-opting chemists unless they happen to be employers. I feel sure, however, that as those labour questions which now occupy the main portion of their time become more definitely adjusted, these Councils will turn their attention to their other objects—the development of processes, the encouragement of

research, and similar problems. Our negotiations so far reveal clearly the desire of the Councils to turn to science whenever suitable occasions arise. The desire may exist, but, unless direct representation is made possible, there will always be the danger of opportunities being missed simply because the relevancy of science to a subject under discussion may not be recognised or recognisable in the absence of scientific men who could point to that relevancy. It is the opportunities missed which retard the development of science in industry. It is not knowing when to turn to science which is the danger if science is not represented and the men are not there to point out its applicability. Although the Institute may not at present secure direct representation or co-optation on these Councils, I feel sure that we have done well in bringing the Institute to their notice and in offering impartial assistance in matters relating to chemistry and chemists. I hope and believe we shall find that, in proportion as the chemists establish their claim to adequate recognition, from the economic point of view, the employers will be ready to meet them on a proper footing as professional men, because they (the employers) must look increasingly to men possessing a high degree of technical knowledge and experience to help them over the difficulties with which they are confronted. The chemist's power must lie in his ability, skill and personality, and each must endeavour so to acquit himself that he cannot fail to secure the material reward that is his due.

The Glass Research Committee is still watching your interests in the difficult matter of ensuring supplies of satisfactory laboratory apparatus, and I have hopes that the present year will see marked improvements in the manufacture of these requirements in this country.

The House Committee and Library Committee have carried out their respective functions with due regard to the funds available. I regret that it was not possible to unveil our War Memorial to-day, but I anticipate that it will be erected in the hall during the present month. The bookcase to be purchased with the bequest from Mr. Holloway should

also have been received, but it is not yet finished. I am pleased, however, to call your attention to a bronzed cast of the figure of Priestley, a replica of the well-known statue by Williamson (the father of one of our Fellows). This has been received from Mrs. Bedford McNeill, whose husband was a Priestley Scholar, a Fellow and Member of Council. We are glad to have it in memory of an esteemed colleague and also because you will recognise that the design is the main feature of the Seal of the Institute.

Of the work of the Nominations and Examinations Committee I cannot speak too highly. The members of this Committee have worked arduously and often late into the night in order to cope with the applications submitted to them, and have given careful consideration to many matters, including a thorough overhauling of the Regulations. I trust that the result of their deliberations will now be given a fair trial and that we shall not find it necessary to make further radical changes for some years to come, although there can be no finality in these matters in a progressive institution of this character. I believe that when the new Regulations are published—we hope in Part II. of the Journal—they will be found to constitute a sound and straightforward system of qualification which should ensure the maintenance of a very high standard of efficiency among British chemists and materially advance the prestige of the Institute. You will observe, too, that we hope to remove, as far as is reasonable, any obstacle to the admission of the less fortunate student of promise whose circumstances prevent the rigid fulfilment of a University day course.

I think that the Proceedings which have appeared during the past year have contained more matter of interest to the members, and that the first Part of the Journal for the present year gives promise of a still greater development.

The title of the Proceedings has been changed to the "Journal and Proceedings," and from the short report of the Proceedings Committee you will gather that the Council has determined upon an extension of the contents of the publication.

It is not our intention to deal with matters lying outside our proper functions as a professional body, either with regard to subjects or advertisements, but there are many questions of immediate interest to the members which can profitably be dealt with in the pages of the Journal, and we hope to develop this side of the Institute's activities. Our thanks are due to Dr. Brady for his keen interest in this department of our business.

The Public Appointments Committee also has done good work in conjunction with the Society of Public Analysts, mainly in the interests of those holding statutory appointments and engaged in consulting practice. Owing largely to the vigilance of the Joint Committee of the Institute and the Society, we have the satisfaction of recording that chemistry is represented at the Ministry of Health. We are fortunate in having Sir William Tilden, a Past President, as our first direct representative of chemistry, and note with satisfaction that two other Fellows, Dr. Eustace Hill and Dr. Gowland Hopkins, are also Members of the Council on Medical and Allied Services of the Ministry. Since the publication of the report Dr. Tocher, another Fellow, has been appointed a member of the Consultative Council on Medical and Allied Sciences of the Scottish Board of Health.

The Reagents Committee is taking up the question of the continued production of chemical reagents in this country, and records of its work will be published from time to time in the Journal.

The Services Committee, on which members of our Institute and of the Institute of Metals are acting jointly, is still engaged on questions affecting the status and organisation of chemists and metallurgists in the Navy, Army, and Air Force.

The Local Sections have made good progress during the year. They have been active in promoting conferences on professional matters and generally in bringing their respective members together to their mutual advantage. Reports of their functions have been noted in the Proceedings, and it is intended to reserve a portion of each Part of the Journal of the

Institute for this purpose. The Section Committees have been consulted on the revision of the By-laws and on other matters. The Council have been gratified to receive from them many suggestions which have been decidedly helpful and have clearly demonstrated the usefulness of the Sections and justified their formation.

The Council have also recorded their appreciation of the help rendered by our Honorary Corresponding Secretaries in Overseas Dominions who have assisted by expressing their views on matters transmitted to them. We note with pleasure the progress of professional chemical bodies which have been established in South Africa, Canada and Australia, and with which we are ready at all times to co-operate in the common interest.

I have now briefly reviewed the Report which is submitted for your adoption, but, as President, must not neglect to acknowledge the earnest work and devotion of the Vice-Presidents, Honorary Treasurer, and Members of Council, and particularly of the Chairmen of Committees and others who have kindly taken my place when I have unavoidably been absent from Committee Meetings.

I would now refer again to the Regulations and make a few remarks on the education of the chemist.

With the remarkable development of our science which has taken place even during the present century, it is obvious that extension of the ordinary period of training is imperative. The past few years have confirmed in a convincing manner the fact that intellectual equipment is one of the greatest assets to any country. We have to remember also that mediocrity in any profession is common enough, and it is essential to encourage the coming generation to higher effort. We look to our younger members, therefore, to work for the advancement of their science, not only in their own interests but also for the good of the country. Whatever degrees or diplomas they may obtain, they cannot expect success in any form without hard work.

The profession has reached a stage in its history which

is full of promise to those who devote themselves earnestly to their subject. The ideas of science are becoming more generally understood and, in the place of neglect, we find attention given to the position of science in the schools and in higher education, and in a rapidly increasing degree in industry and commerce. The policy to be followed by the Institute in this connection has occupied much of the time and thought of the Council. The demand for a policy exists in all phases of life, in Government, in all our Institutions, in our own Institute and in ourselves individually ; a line of action directed to good purpose, efficiency and duty. Our duty is to secure for the service of the State a supply of chemists of the highest competency, to apply adequate tests, to register the competent, to maintain their efficiency and integrity, and thus promote the status of the chemist. The responsibility rests not only with the Council but with every individual member.

A year ago I stated that there was still a doubt in the minds of some of us as to whether we had then formulated sufficiently the problem of the training of the chemist, and at the same time remarked that we hoped to invite professors and teachers to a conference on the subject. However, in the course of our deliberations and having regard to the opinions expressed at the previous conference, held in 1912, and the course adopted by the Institute in April, 1918, whereby those opinions had clearly been met so far as the qualifications for the Associateship were concerned, we proceeded, with the aid of the Board of Examiners and the Chemical Technology Examinations Board, to revise our requirements without trespassing on the time of the main body of teachers who are now so fully occupied ; for, as you are no doubt aware, the laboratories of the Universities and Colleges are scarcely able to accommodate the students who are pursuing courses in our science. The first conclusion arrived at was that, since the Institute had decided to accept Honours Degrees in lieu of the Associateship Examination, that Examination should be general instead of special in its scope and character, leaving the period of Associateship for the necessary experience and preparation for an

examination of a specialised character for the Fellowship. The Examination for the Associateship, therefore, will be the test of general training received by a student who has attended a recognised college for not less than four years, and the Examination for the Fellowship will constitute a higher test in a particular branch of work. The preparation of the syllabus for the latter has been the more difficult problem ; but I think it has been so thoroughly considered and wisely planned that I have little doubt that when you have had an opportunity of looking into it, you will agree with me that it constitutes a fair and reasonable test for the chemist of experience, and provides the machinery, necessarily somewhat complex, for ensuring a very satisfactory standard of competence.

I think the members will be interested to hear that on February 22nd Mr. Pilcher completed his twenty-fifth year as Secretary of the Institute of Chemistry. Many of us can recall several occasions, like the present one, when the valuable services of our Registrar and Secretary have been referred to. During the past year I can say that he has more than maintained his high reputation for single-minded devotion to the interests of the Institute and able administration of its affairs. It must be a satisfaction to him, it is a matter for great satisfaction to us, that twenty-five years of work well done and duties capably and unselfishly performed have not dulled his keenness, for never has he shown greater eagerness and readier wholeheartedness in the shaping and promotion of new developments than during the period of anxious activity through which we have recently passed.

On account of the great increase in the secretarial duties, and in order to give the Registrar more freedom for that part of his work which deals with some of the broader issues of the policy of the Institute, the Council decided to appoint an Assistant Secretary. In May last year, Mr. G. S. W. Marlow was elected to the position. The members will be glad to hear that the Council have good reason to be well pleased with their choice. During the past nine months Mr. Marlow has worked

exceptionally hard and has shown the right kind of interest in the affairs of the Institute, together with marked power of grasping their professional significance. He is, as most of you are aware, a fully qualified chemist of experience, and the Council realise with great satisfaction the valuable help which he has already given to the official work of the Institute in the exercise of a combination of scientific attainments with undoubted administrative ability. We may congratulate him on his good start, and we look forward with confidence to his future work with us.

As President, I see more of the inner working of the office than any of you, except perhaps the Treasurer, and I would like to express, on behalf of the Institute, our thanks to the staff and our appreciation of their services during a year of exceptional stress.

Editorial.

On the subject of the status of chemists and particularly the question of remuneration, the President, in his address, and in his letter to the Chairman (p. 89), which were read at the Annual General Meeting, gave expression to the feeling of many chemists of long experience. He exhorted members of the profession to consider the importance of looking to results from individual effort to justify their claim for more substantial recognition, quite apart from any organised collective effort.

The tendency to quote glaring examples of unsatisfactory conditions as if they were the general rule has created an impression which is not entirely borne out by the facts, and there is a danger that, by holding these out as the rule when they are really the exception, the value at which the services of the chemist are even now assessed may be misrepresented to his disadvantage. It is proposed, therefore, to follow a little further the line indicated by the President and to take a survey of the situation.

Apart from the conditions arising from the war, the present position of professional men, as a whole, is attributable in a large measure to their callings becoming overcrowded, and this, in turn, is due to the provision of free education, whereby many who could not at one time have aspired to professional work have attained a higher social standing than would otherwise have been their lot.

In spite of the fact that the opportunities in professional work of rising above a certain salary, say £750, are fewer than in commerce, overcrowding prevails in all professions, especially in the modern professions, in which, at present, there is no statutory restriction of practice, and for which our educational

system has been developed by the provision of Secondary and Technical Schools. Moreover, the higher appointments in such professions fall not always to the most expert, but often to men possessing character and personal qualifications, which, to a considerable extent, compensate for less marked ability in their particular work. This applies in all professions and should be borne in mind by parents whose boys aspire to professional work.

With these considerations in view the question arises—What part can professional bodies take in assuring employment to any surplus of qualified men and in assuring remuneration commensurate with the necessary education and technical training?

That the Institute has taken its part to some purpose has been clearly substantiated by the figures given by the President, which show that less than one per cent. of the members are at present without appointment; while one of the main reasons for the success of the Institute in securing appointments for its members is the recognition accorded by employers to the Institute's guarantee of competency.

The problem of disposing of the surplus in the future, in view of the very large number of chemists likely to qualify in the next few years, is, however, an extremely serious one, since it is doubtful whether the chemical industry of the country will develop rapidly enough to absorb the greatly increased supply of qualified men which will become available. If, then, as may be expected, only chemists of the highest attainments, both scientific and personal, have a prospect of securing satisfactory appointments, the necessity for individual effort is obviously imperative. The Institute is taking every step possible to promote the further employment of chemists in the development of the chemical industry of the country, but it seems necessary to sound this note of warning.

The prevailing ignorance on the part of the general public of the functions of the chemist is largely due to the fact that, in the past, he has restricted his operations within the four walls of his laboratory rather than applied his talents in a

wider sphere of activity. There has been little tendency on the part of chemists to make use of their knowledge in commerce or in administrative work ; but the leavening by chemists of occupations hitherto not actively connected with chemistry would often be advantageous, not only to the individuals, but to the community. Any who have distinct aptitude for business should therefore be encouraged to exert themselves in that direction, since their technical knowledge should give them an advantage over their less-informed competitors.

With regard to the second part of the question, the data published in Part I. of the Journal afford only a rough basis on which to consider whether the remuneration of chemists is, or is not, reasonable ; but the information given should enable many members of the profession to see how they stand, and to take steps to improve their positions. Had the replies received in answer to the circular issued in August, 1919, been more representative, the data, in all probability, would have revealed a more satisfactory state of affairs ; it might have been expected also that, on the publication of the data, many of the less fortunate chemists would have taken advantage of the facilities afforded by the Appointments Register, yet this has not been the case : on the contrary, the number of members using the Register has since decreased.

Supposing, however, that the position in which the majority found themselves were such that collective action of some kind became unavoidable, what part could the Institute take ? The suggestion that chemists, as professional men, should strike in order to obtain more satisfactory conditions of work and remuneration has been repudiated by all organisations concerned. What, then, is the alternative ? Chemists who are deserving of more substantial recognition than they receive must do all they can to prove it by showing that they can do better elsewhere. The Institute helps them to do this by means of the facilities afforded by the Appointments Register, and they are urged to take advantage of those facilities, both in their own interests and in those of the general body.

Employers, it is true, are not always alive to the value of the services of their chemists ; but the efforts of organised bodies will never convince the employers on these matters unless such efforts are supplemented by initiative and enterprise on the part of the individual members of such bodies.

The majority of Fellows and Associates are doing well in the profession ; and, notwithstanding the published data, the discontent of which so much is heard is now thought to be, in reality, less prevalent than was supposed. The men occupying leading positions in the profession are by no means unsympathetic with the aspirations of the younger men, but look to them to take their part in maintaining the position of chemists as professional men, who can approach their employers on terms of equality—the attitude which the employers themselves, in most cases, wish them to adopt.

It is well to remember that for many years the founders of the Institute developed the professional status of chemists and were actuated by ideals which aimed at forming a body of men commanding the respect of the public and capable of maintaining the dignity and welfare of their profession. These ideals must be upheld.

Appointments Register.—A question was raised at the Annual General Meeting by Mr. H. Droop Richmond as to the cost of the Appointments Register during the year 1919. The expenditure was approximately as follows :—

	£	s.	d.
Printing, Stationery, Office Books..	60	9	11
Postage	79	19	8
Salaries, etc.	38	0	0
Advertisements	25	0	0
	<hr/>		
	£203	9	7
	<hr/>		

The receipts were £93 3s. 9d., so that the net cost was

approximately £110 ; but that does not include any estimate for the time devoted to the work by the Registrar and the Assistant Secretary. The results fully justify the outlay, inasmuch as the work has materially improved the position of chemists in respect of their employment generally, and will react on the reputation and prosperity of the Institute.

Proceedings of the Council.

Appointment of Committees.

The Council elected on March 1st held their first meeting on March 12th, when they appointed the Standing and Special Committees with their respective chairmen (see pp. 78—80).

In view of the importance of the functions of the Nominations and Examinations Committee and the Institutions Committee, and the general interest taken in their work, it was decided to amalgamate the two Committees, the Council as a whole constituting the new body.

Three additional Special Committees have been appointed :

- (1) Legal and Parliamentary,
- (2) Benevolent Fund, and
- (3) Research Chemicals Committee.

The Revised Regulations.

The revised Regulations for admission to the Institute can now be obtained gratis on application to the Registrar.

The following synopsis covers only the main requirements :

PRELIMINARY EXAMINATION.—All candidates are required to have passed an approved Preliminary Examination unless the Council in exceptional circumstances decide to accept other evidence of general education.

STUDENTSHIP.—The minimum age for registration will be sixteen years. At the time of application the Student must be undergoing training at a recognised university or college, or with a Fellow in a laboratory or works approved by the Council. The names of Students who do not qualify for the Associateship within seven years will be removed from the Register, but such Students may, at the discretion of the Council, be re-registered.

Registered Students are required to comply with the Regulations relating to admission to the Associateship which are in force at the time of their registration ; but Students at present registered may apply to present themselves under the new Regulations. Other candidates for the Associateship are required to comply with the Regulations in force at the time of their application for admission.

TRAINING.—The compulsory subjects—Chemistry, Physics, and Mathematics—remain the same as in the previous Regulations, the course in Chemistry extending over at least four years' day training. The standard for the subsidiary and optional subjects is that of an approved University Intermediate Science course, with the following additional requirements: viz., that the course in Mathematics must include elementary calculus, and the courses in Higher Physics and Higher Mathematics must correspond with those required for a recognised University Degree or a diploma of equivalent standard.

The training of a candidate for the Associateship by evening classes is formally recognised, provided that the candidate is engaged in the practice of chemistry during the day and attends a systematic course in the required subjects, previously approved by the Council, extending over at least five years, and is recommended by his teachers as a candidate for examination.

Candidates are required to produce evidence of having passed the class examinations in all the requisite subjects, or having obtained, by examination, an approved degree or diploma covering the necessary subjects.

ASSOCIATESHIP is attainable by examination by candidates who have fulfilled the prescribed training or who have obtained a degree including the necessary subjects, and have worked for a further year in a recognised university or college, or for two years with a Fellow in a laboratory or works approved by the Council.

The Council will also consider applications from candidates, not less than twenty-seven years of age, whose qualifications are not in accordance with the foregoing requirements, provided that they are satisfied that such candidates have fulfilled equivalent conditions (prescribed in the Regulations), that they have been engaged in the study and practice of chemistry for at least ten years and are recommended by at least three Fellows. The Associateship may be granted (without Examination) to graduates with first or second class honours in chemistry or holders of diplomas recognised by the Council as equivalent, who have completed a four years' course in the requisite subjects or a three years' course supplemented by approved experience in a laboratory or works approved by the Council. Applications from candidates possessing diplomas of a specialised character will be decided on their merits. Exceptional cases, provided for by the resolutions adopted by the Institute in General Meeting held in April, 1918, will not be considered after December 31st, 1921. Applications for special consideration under the temporary (war) measure must be received at the office on or before August 1st, 1920, except in the case of any candidate whose academic training was seriously interrupted by service with the colours.

The Examination for the Associateship will occupy at least five days, and will consist of :—

(A) *An examination in general theoretical chemistry.*

Candidates will be required to show a thorough acquaintance with the fundamental laws and the current theories of chemistry, together with the properties and the methods of preparation of the more important elements and of their compounds, both inorganic and organic; their application in the arts and industries. At least two papers including questions in inorganic, organic, and physical chemistry, will be set.

(B) *An examination in practical chemistry.*

Exercises in qualitative analysis and quantitative analysis (both gravimetric and volumetric), including the analysis of

alloys, ores and minerals, and the determination of substances present in minute quantities, as impurities or otherwise, in commercial products.

Preparation and purification of well-defined chemical substances.

Organic analysis, including the recognition and determination of the elements and of typical groups and radicles ; the identification of organic compounds.

Gas analysis.

The determination of physical constants and the use of physical instruments employed by chemists.

The examination in quantitative analysis may include the performance of some operation selected from the candidate's own record.

Candidates are required to satisfy the examiners as to their ability to translate technical literature from French and German into English with the aid of dictionaries. Another foreign language may be substituted for French with the approval of the Council.

FELLOWSHIP.—Every Associate applying for election to the Fellowship must produce evidence that he has been, since his admission to the Associateship, continuously engaged in the study and practice of chemistry in a manner satisfactory to the Council, and must pass an examination in a specified branch (see below) or produce evidence satisfactory to the Council—

- (i.) That he has carried out original research of sufficient merit ;
- or (ii.) That he has devised processes or inventions of sufficient merit ;
- or (iii.) That he is possessed of knowledge and ability equivalent to having fulfilled the conditions contained under (i.) or (ii.) above.

The Examination for the Fellowship will occupy at least five days. Each candidate for the examination is required to

select a Branch, and, where necessary, section and group in which he desires to present himself, such selection to be approved by the Council.

BRANCH A.—*Inorganic Chemistry.*

The candidate will be expected to show a fundamental knowledge of inorganic chemistry, with an intimate knowledge of the methods of inorganic analysis, qualitative and quantitative, and the methods of research.

In addition, the candidate will be expected to show a special theoretical and practical knowledge of one of the following sections :—

Section I. *Mineral Products.*—The nature and economy of ore and mineral deposits ; crystallography ; identification of hand samples of ores, coals and minerals ; methods of sampling, analysis and assay, with reports thereon ; methods of examination by the microscope and spectroscope, and interpretation of the results ; treatment of minerals (other than smelting for metals) to obtain substances useful in the arts and manufactures.

Section II. *Metallurgy.*—Sampling, analysis and assay of ores, minerals, fuels, metals and alloys, used in metallurgical processes and of metallurgical products, with reports thereon ; analysis of furnace and fuel gases ; fuel economy ; metallurgical processes, including electro-chemical methods ; metallurgical apparatus and plant ; the principles underlying the preparation of alloys ; thermal analysis ; metallography ; preparation of specimens and recognition of characteristic structures of metals, ferrous and non-ferrous alloys, and of structural changes produced in them by various forms of thermal and mechanical treatment ; spectroscopy ; pyrometry.

Section III. *Manufactured Products.*—The chemistry and technique of the manufacture of one important group of inorganic substances (acid, alkali, cement manufacture, etc.), including the chemistry and treatment of

all related materials and by-products ; the methods of analysis employed in the industry selected ; the sources of raw materials ; the application of finished products. Economic conditions of manufacture.

At least one paper will be set on the general principles of the branch and one paper on the section selected, and the practical examination will occupy not less than four days.

BRANCH B.—*Physical Chemistry.*

The candidate will be expected to show a fundamental knowledge (theoretical and practical) of the methods, instruments and apparatus employed in physico-chemical processes and investigations, and of the methods of research.

In addition, he will be expected to show a special knowledge of the application of physico-chemical methods to one important branch of industry.

At least one paper will be set on the general principles of the branch and one paper on the particular industry selected, and the practical examination will occupy not less than four days.

BRANCH C.—*Organic Chemistry.*

The candidate will be expected to show a fundamental knowledge of organic chemistry, the methods of organic analysis, qualitative and quantitative ; the determination of constants of organic compounds and the methods of research.

In addition, the candidate will be expected to show a special knowledge of the chemistry and technique of the manufacture of one important group of organic compounds (oils, fats and waxes ; coal tar dyes ; drugs ; essential oils ; alkaloids, etc.), including the chemistry and treatment of all related materials and by-products ; the methods of analysis employed in the industry selected ; the sources of raw materials ; the application of finished products. Economic conditions of manufacture.

At least one paper will be set on the general principles of the branch and one paper on the particular industry selected,

and the practical examination will occupy not less than four days.

BRANCH D.—*Agricultural Chemistry.*

The candidate will be expected to show a fundamental knowledge of chemistry (theoretical and practical) in relation to agriculture ; the technique of bacteriology and microscopy ; the methods of research.

In addition, the candidate will be expected to show a special theoretical and practical knowledge of the chemical and physical characteristics of soils, farmyard manure, fertilisers and feeding stuffs ; insecticides, fungicides, sheep dips, etc. ; the chemistry and biology of plant growth ; nutrition ; metabolism of food ; evaluation of diets ; “residual values” of fertilisers and feeding stuffs and their economic value ; the chemistry of farm and dairy products ; the storage and preservation of crops ; the purification and treatment of water and sewage and their use in agriculture ; enzymes ; the nature and functions, and the identification, of the more common micro-organisms, which have useful or deleterious action in agricultural industries.

The candidate will be expected to be fully conversant with the Fertilisers and Feeding Stuffs Act and other legislation relating to the chemical aspects of agriculture, and to be able to frame his reports in accordance therewith.

At least two papers will be set, and the practical work will occupy not less than four days.

BRANCH E.—*The Chemistry (including Microscopy) of Foods and Drugs, and Water.*

The candidate will be expected to show a fundamental knowledge of chemistry (theoretical and practical) in relation to foods and drugs ; the technique of microscopy and bacteriology ; methods of research.

In addition, the candidate will be expected to show a special theoretical and practical knowledge of the chemistry of foods and their constituents ; their origin, composition and analysis ; the commercial preparation and preservation of

food ; the identification and estimation of the adulterants, impurities and preservatives which may be found therein ; the general principles of dietetics.

The examination of water, sewage and effluents.

A knowledge of the drugs and chemicals used in pharmacopœial preparations and prescriptions ; their recognition, microscopical and chemical examination and analysis ; the determination of impurities and falsifications ; the pharmacological action and the therapeutical value of drugs.

A general knowledge of poisons and their effects, including a knowledge of the dangers from poisoning by chemicals used in trade processes ; the methods of toxicological analysis ; the detection of blood stains ; the examination of urine.

The examination of antiseptics and disinfectants.

The candidate will be expected to be fully conversant with the Sale of Food and Drugs Acts and with other Acts and Regulations relating to food, drugs, poisons, dangerous trades, etc., and to be able to frame his reports in accordance therewith.

At least two papers will be set, and the practical examination will occupy not less than four days.

BRANCH F.—*Bio-chemistry.*

The candidate will be expected to show a fundamental knowledge of chemistry (theoretical and practical) in relation to plant and animal life ; the technique of microscopy and bacteriology ; methods of research.

In addition, the candidate will be expected to show a special theoretical and practical knowledge of the technical application of bio-chemistry in one important field.

At least two papers will be set, and the practical examination will occupy not less than four days.

BRANCH G.—*Chemical Engineering.*

The candidate will be expected to show a fundamental knowledge of chemical engineering and technology and the methods of industrial research ; the application of well-known chemical and physical laws to industrial operations ; the

development, control, and transmission of power and heat ; fittings and stores ; operations and plant, of which general use is made in chemical industry for the treatment and handling of materials, finished products, waste products and effluents. The properties of materials which affect their application to the construction of plant and apparatus in chemical works ; the making and interpretation of working drawings of plant ; process costs ; works accounts.

In addition, the candidate will be expected to show a specialised knowledge of the chemistry and technique of one important branch of industry, including the chemistry and treatment of all related materials and by-products, and the methods of analysis employed in the industry selected ; the sources of raw materials ; the application of finished products ; economic conditions of manufacture.

The candidate will be expected to be fully conversant with the Factory Acts and other legislation relating to the industry selected, and to possess a knowledge of safety devices and rescue work.

At least two papers will be set on the general principles of chemical technology, and two papers on the selected industry, and the practical work will occupy not less than three days.

Questions which might involve the disclosure of unpublished processes and details of plant in particular works will not be put.

NOTES.

Branches A, B and C.—These branches are suitable for those chemists engaged in analytical, consulting or research work in connection with industry. Questions will not be set involving an intimate knowledge of chemical plant or of chemical engineering, though the candidate will be expected to have a general knowledge of the plant used in the special industry he selects.

Branch D.—This branch is suitable for chemists desiring to qualify as Official Agricultural Analysts, and as analysts and consultants in chemical matters relating to agriculture.

Branch E.—This branch is suitable for chemists capable of acting as Public Analysts under the Sale of Food and Drugs Acts, and as analysts and consultants in chemical matters relating to food and drugs.

The examination in this branch is conducted on lines approved by the Local Government Board for England and Wales, and the Local Government Boards for Scotland and Ireland, who accept the certificate granted on passing this examination as evidence that the holder is qualified for appointment as Public Analyst under the Sale of Food and Drugs Acts.

The functions of the Local Government Boards for England and Wales and for Scotland have now devolved upon the Ministry of Health and the Scottish Board of Health respectively.

Branch F.—This branch is suitable for chemists engaged in analytical, consulting or research work, involving the application of bio-chemistry.

Branch G.—This branch is suitable for chemists concerned with processes and plant in industry.

A certificate will be issued to each successful candidate showing the branch in which he has passed, and the group of industries selected for special consideration.

FEES.—The Examination and Entrance Fees have been amended in certain particulars, but may be further modified when the revised By-Laws have been adopted.

The list of Universities, Colleges and Institutions has been extended by the addition of colleges and institutions notified from time to time in the Journal and Proceedings.

Public Analyst and Medical Officer of Health.

The Town Clerk of the Metropolitan Borough of Stepney recently notified the Institute of the proposal of the local authority to appoint a chemist and analyst. The officer to be appointed was required to be qualified to hold the position as public analyst in accordance with the regulations as to competency of the Ministry of Health. The conditions which

it was proposed to attach to the appointment prescribed that the chemist and analyst should act under the direction of the medical officer of health in so far as the arrangement of work was concerned, and other conditions attached to the appointment indicated that the authority intended that the public analyst was to be subordinate to the medical officer of health for the Borough. The proposal was therefore brought to the notice of a Joint Committee of the Institute and the Society of Public Analysts, on whose recommendation a letter of protest was addressed, on behalf of the Councils of the two bodies, to the Borough Council, embodying the following views :—

The Sale of Food and Drugs Acts provide that a public analyst shall be appointed by the local authority and answerable directly to the authority ; there is no ground for providing that he shall be answerable to a medical officer of health. While the Councils of the Institute and the Society agree that the direction of the taking of samples should be controlled by a responsible officer, they hold that, under the provisions of the Acts, it is the duty of the analyst to report to the purchaser of the sample—the person submitting the sample for analysis in accordance with the Acts—who may be a private purchaser or a medical officer of health or other officer specified in Section 13 of the Act of 1875. The analyst, therefore, is not necessarily required to comply with the condition proposed by the local authority that he should correctly analyse every sample submitted by the medical officer of health and expeditiously report the result of the same to that officer.

The conditions of appointment provided that certificates of analysis should be delivered to the medical officer of health for submission to the Health Committee ; whereas, under the Acts, such certificates are to be given to the person submitting the sample for analysis, as above, although there is no apparent objection to the reports being transmitted to the Health Committee.

Next, the conditions provided that the medical officer of health was to advise as to whether there was sufficient

evidence, in the report of the analyst, to justify legal procedure ; but since the Acts were not entirely in the interests of health but very largely for protection against fraud, the Councils expressed the opinion that, in the majority of cases, public analysts themselves are best fitted to advise their authorities whether the results of analysis are such as to justify legal proceedings. The conditions of appointment also provided that the analyst should inform the medical officer of health in the event of absence from duty and arrange with that officer as to the time of taking annual vacation. While admitting that it was highly desirable that the two officers should be mutually informed of such absence and arrangement for vacation, the Councils held that this clause also appeared to indicate that the public analyst was to be in some measure subordinate to the medical officer of health.

The Councils, therefore, asked the Stepney Borough Council to revise the terms of the appointment in order to make it quite clear that the public analyst is to be an independent officer and in no way subordinate to the medical officer of health, although answerable, as provided in the Acts, to the Borough Council and the Ministry of Health.

The two professions in question are entirely distinct and require a different preparation and training. The principle involved in the suggestion that the public analyst should be in any way subordinate to the medical officer of health is contrary to the interests of the profession of chemistry, while the proposed conditions, if insisted upon, would undoubtedly have the effect of dissuading many qualified men from becoming candidates for the appointment. It would be as unreasonable to require the Town Clerk to be answerable to the medical officer of health in legal matters or to require a workman engaged in one trade on a building to be answerable to a workman engaged in another trade.

The Town Clerk was requested to submit the communication to the Borough Council and to the Health Committee.

The conditions to which exception was taken by the Councils of the Institute and the Society of Public Analysts were not

included in the announcement originally made with regard to the appointment. Four candidates for the appointment, Members of the Institute, were invited to an interview, and some only then became aware of the additional conditions attaching to the appointment. Two candidates then withdrew and one of the remaining two was appointed. The Borough Council subsequently expressed their regret that they were unable to see their way to modify the conditions attached to the appointment. The correspondence had been forwarded to the Ministry of Health with a letter urging that the conditions, so far as they affect the appointment of public analyst, should be modified to render the analyst independent of the medical officer of health.

Income Tax.

Further correspondence has passed between the Institute and the Commissioners of Income Tax with regard to abatement on the subscriptions of Fellows and Associates. The Commissioners have forwarded a copy of an agreement which, however, is hardly applicable to the Institute, as it is intended for Trade Associations. Under this agreement, subscriptions could be admitted as an expense in computing profits only in the case of trading members (private practitioners), and no allowance could be made in the case of those occupying salaried appointments, while in computing the income of the Association the subscriptions received from members in the latter category would not be assessed.

The agreement, therefore, would operate adversely to the Institute, and would not benefit the members.

In Part I. of the Journal reference was made to the appointment of representatives to a Joint Committee of the National Union of Scientific Workers and other Bodies to form a deputation to Government with a view to securing and regularising abatement of income tax on subscriptions to scientific societies, and on the cost of journals, books, and instruments. A memorial is being prepared which the Joint Committee propose to address to the Lords of the Treasury.

Ex-Service Chemists.

The Ministry of Labour, through its Appointments Department, has made a special appeal to business and professional men to assist in solving the problem of resettling demobilised officers in civil life. The Institute has accordingly signified its readiness to do all that is possible in the way of helping chemists who have served with the forces. Happily, ex-service chemists who are without appointments are at the present time few in number : those whose names are on the Appointments Register of the Institute are regularly receiving lists of suitable vacancies.

Poison Gas.

In answer to a question put in the House of Commons on March 9th, Mr. Winston Churchill, Minister for War, said that the question as to the wisdom of abolishing poison gas as a recognised method of warfare was an important one, which ought to be discussed by the League of Nations. At present the difficulty of preventing discoveries in this form of warfare, and the danger that preparations might be made unknown to us, made it very necessary that we should be in a position to protect our troops against novel forms of this kind of attack. It was one of those subjects that should receive the attention of a great international body.

Local Sections.

Edinburgh and East of Scotland.—The Annual Meeting of this Section was held in the Cockburn Hotel, Edinburgh, on December 12th, 1919, Dr. T. W. Drinkwater presiding. The officers and committee for the ensuing session were elected.

Mr. A. M. Cameron raised the question of the supply of chemicals and apparatus with special reference to the position created under the proposed "Anti-Dumping" Bill, and a discussion followed in which the following took part: the Chairman, Drs. Leonard Dobbin, H. E. Watt, and J. F. Tocher, Messrs. C. Norman Kemp, B. D. Porritt, W. A. Williams, J. Adam Watson, S. Stewart, W. T. H. Williamson, and E. Anderson.

Mr. A. M. Cameron moved: "That this meeting is strongly of opinion that the Council of the Institute of Chemistry should bring to the notice of the Government Departments concerned the great importance of ensuring that before any Regulations or Orders concerning laboratory chemicals or scientific apparatus be made under the proposed 'Anti-Dumping' Bill, the advice of the Council of the Institute, or of persons nominated by them, be sought." Mr. B. D. Porritt seconded, and, on being put to the meeting, the resolution was carried unanimously, it being decided to forward a copy for the information of the Council.

The First Annual Dinner of the Section was held in Ferguson and Forrester's Restaurant, Edinburgh, on February 23rd, 1920, Dr. T. W. Drinkwater, Chairman of the Section, presiding.

Telegrams were read from Sir Herbert Jackson, President, and the Registrar, expressing regret at their inability to attend and conveying good wishes for a successful gathering.

There were present as guests Dr. D. S. Jerdan, Chairman

of the Edinburgh Section of the Society of Chemical Industry, and Mr. J. Rutherford Hill, Secretary of the North British Branch of the Pharmaceutical Society.

In the course of his remarks the Chairman referred with satisfaction to the appointment of Dr. J. F. Tocher as representative of the chemical profession on the Consultative Council for Medical and Allied Services in connection with the Scottish Board of Health.

During the evening a musical programme was provided, to which the Chairman, Dr. A. Lauder, Dr. J. F. Tocher, Messrs. J. A. Watson, A. W. F. Chatfield, N. T. Hay, and W. F. Martin contributed. A topical element was introduced by Dr. Drinkwater, who recited verses on "The Atom," composed for the occasion, and containing numerous allusions to modern conceptions of atomic structure.

The next meeting of the Section will be held towards the end of April.

Gretna and District Section.—Meetings of the Section have been held each month, when matters of scientific and professional interest have been submitted for informal discussion. On Friday, November 28th, a discussion was introduced by Mr. William Caw on "The Possibility of the Ignition of Explosives and Explosive Vapours." On Monday, December 22nd, the postponed Annual General Meeting took place at Eastriggs; a short account of the past history of the Section was given by the Secretary, and arrangements were made for the future work. On Friday, January 16th, Mr. T. H. Gant opened a discussion on "The Chemist in Politics"; on Friday, February 20th, a discussion was introduced by Mr. J. S. Hill on "Some Problems of Water Analysis," and on Thursday, March 25th, Mr. H. R. Neech dealt with "The Present Position of Sulphuric Acid."

Irish Section.—A meeting of the Section will be held in the near future, at which Mr. J. W. Parkes will exhibit a number of lantern slides illustrating the methods of production of Cordite.

Liverpool and North-Western Counties Section.—A Smoking Concert was held in March, Mr. Watson Gray presiding, and the arrangements being organised by Mr. William Doran.

The March meeting of the Liverpool Section was the best attended since the inaugural meeting. The subjects for discussion were the remuneration of chemists and the closing of the profession. The Section proposes to send resolutions to the Council on these subjects. Meetings are held on the second Thursday in each month except during July, August, and September.

London and South-Eastern Counties Section.—On Wednesday, February 18th, Mr. A. Chaston Chapman gave a lecture before the Section in the Council Room of the Institute. The subject selected was "Yeasts," and the lecture was illustrated by lantern slides.

Mr. Chapman introduced the subject with portraits of the pioneer workers on the subject, describing their work which led up to the modern classification of the various types of yeasts and allied organisms. A hearty vote of thanks was passed to the lecturer.

An announcement was made that at future meetings arrangements would be made for a "question time" during which members of the Section would be given an opportunity of asking for information on professional and technical matters.

Manchester and District.—The Annual General Meeting of the Section was held in the Victoria Hotel on December 17th, 1919, nearly forty members being present.

The Chairman, Mr. James Grant, gave an account of the work of the Section during the year, and indicated the lines of future progress.

At the conclusion of the formal business Mr. C. E. Potter opened an interesting discussion on the position of the many youths now training as chemists' assistants in factories, in particular with regard to their prospects of ultimately gaining

admission to the Institute. The importance of the matter was emphasised by several speakers in the animated discussion which followed.

The First Ordinary General Meeting of the session was held in the Council Chamber of the College of Technology on February 25th, 1920. About thirty-five members were present, Mr. L. E. Vlies presiding.

The chief item on the agenda was the consideration of the new Bye-laws regulating the election of Council. The democratic principle involved in the new proposals was much appreciated although several speakers expressed the view that still further steps towards democracy were desirable.

The next meeting will be held in the College of Technology on Wednesday, April 21st, at 7 p.m.

South Wales Section.—The Fifth General Meeting of the South Wales Section was held in Swansea on January 31st, 1920, when an interesting and instructive paper was read by Mr. A. E. Caunce, M.Sc., on "The Intensive Working of a Sulphuric Acid Chamber." A discussion ensued and numerous questions were asked and answered. A hearty vote of thanks was accorded to Mr. Caunce.

At a meeting held on March 27th a paper was read by Mr. C. M. W. Grieb on "Mercury Fulminate and Detonators."

The next meeting of the Section will be held towards the end of May.

Personal.

The Council record with much regret the death of Mr. Walter William Fisher, of Oxford, a past member of Council and past Examiner.

Promotions in and appointments to the Most Excellent Order of the British Empire for services in connection with the War :—

C.B.E.

John Charles Burnham, C.S.I.	Prof. Percy Faraday Frankland,
Francis Howard Carr.	F.R.S.
Prof. Frederick George Donnan,	Thomas Martin Lowry, F.R.S.
F.R.S.	William Macnab.
	George Stubbs, O.B.E.

O.B.E.

Harold James Bailey.	James Eckersley Myers.
William John Bowis.	George Henry Perry, M.B.E.
Edgar Reginald Deacon, M.B.E.	Charles Simmonds.
William Porter Dreaper.	Henry Lloyd Snape.
Edward Victor Evans, M.B.E.	Harold Blythen Stevens.
John Jacob Fox, M.B.E.	Peter Wright Tainsh.
William Howieson Gibson, M.B.E.	Thomas John Underhill.
Prof. Gilbert Thomas Morgan, F.R.S.	

Richard Bertram Pilcher, Registrar and Secretary.

M.B.E.

Clement William Bailey.	Reginald Genders.
Marmaduke Barrowcliff.	Kenneth Claude Devereux Hickman.
Harry Thornton Calvert	Henry James Hodsman.
James Scott Dick.	William Christian Hothersall.
Percy Vivian Dupré.	John Price Millington.
William Buckland Edwards.	Lionel Orange.
Arthur Thomas Etheridge.	Cyril James Peddle.
Aquila Forster.	Hugh Edmund Watts.
Archur Edward Garland.	

Mr. F. H. Carr has joined the Directorate of Messrs. The British Drug Houses, Ltd.

Dr. E. H. Cook has been appointed City Analyst for Bath.

Mr. W. S. Curphey has been nominated to act on a Committee of the Ministry of Health, to consider the present state of the law with regard to pollution of air and advise upon steps for the diminution of such pollution.

Major Stanley Elliott has been appointed Analyst to the Royal Army Medical College, Millbank.

Mr. Charles Estcourt has resigned his public appointments, including that of Public Analyst for the City of Manchester, to which Mr. Harri Heap has been appointed, and Public Analyst for the Boroughs of Oldham and Macclesfield, to which Mr. S. E. Melling has been appointed.

Mr. A. R. Ling has been appointed to the Adrian Brown Professorship of Brewing in the University of Birmingham.

Dr. G. W. Monier-Williams, Mr. L. M. Nash and Mr. George Stubbs, have been appointed members of a Committee of the Ministry of Health on Condensed Milk Standards.

Mr. B. D. Porritt has been appointed Director of Research to the Research Association of British Rubber and Tyre Manufacturers.

Dr. J. F. Tocher has been appointed a member of the Consultative Council on Medical and Allied Sciences of the Scottish Board of Health.

The Council of the Royal Society have recommended the undermentioned Fellows of the Institute for election to the Fellowship of the Society:—Dr. E. F. Armstrong, Mr. A. Chaston Chapman, and Prof. Robert Robinson.

Prof. T. H. Easterfield, who has resigned his Chair in the Victoria University, Wellington, New Zealand, has forwarded some interesting particulars of Cawthron Institute, of which he has been appointed the first Director. This Institute promises to be of great importance in the Dominion, and its establishment should be noted by British chemists generally.

The main funds for the endowment of the Institute are derived under

the will of the late Thomas Cawthron, to the value of over £220,000, bequeathed to trustees for the purchase of land and the erection and maintenance of an Industrial and Technical School, Institute and Museum. The Institute, to be situated at Nelson, will contain a museum illustrative of the industries of the Nelson provincial district and the chief scope of its work will be instruction in and performance of scientific research, definitely related to the industries of Nelson and of the Dominion. The research work will in the first instance bear chiefly upon agriculture and in particular upon fruit growing. Provision will be made, as funds permit, for systematic research upon the chemistry, physics and biology of soils, the development of forest lands, including reafforestation, the utilisation of clays and other minerals, the fishing industry, and such other subjects as may from time to time be deemed important and worthy of study. It will be an industrial and technical school, teaching effectively the application of science to national industries, but properly organised research will be the main function of the institution.

The National Efficiency Board of the Dominion Government has made a recommendation in favour of the encouragement of scientific research, and there is a prospect of the Cawthron Institute receiving a subsidy especially in consideration of the substantial amount of death duties paid on the bequest.

RAMSAY MEMORIAL FUND.—A sum of £25,000 has been allotted towards the erection of a Ramsay Memorial Laboratory of Chemical Engineering on a site to be provided by the Senate of the University of London. The total required for building and equipment is £50,000, and a further sum of £25,000 is required as an endowment fund for the provision of salaries and maintenance. The Ramsay Memorial Executive Committee have decided to close the general fund in June, 1920. Contributions should be sent to the Hon. Treasurers, Lord Glenconner and Prof. J. Norman Collie, at University College, Gower Street, London, W.C.

The Library.

Since the issue of the Proceedings for 1919, Part II., the Library Committee have had much pleasure in acknowledging the following gifts:—

BARRETT, E., B.Sc., A.I.C. :

A First Class-Book of Chemistry. E. Barrett, B.Sc., and T. Percy Nunn. *London*, 1920.

BELL, H. D., A.I.C. :

Insect Life on Sewage Filters. W. H. Parkinson, M.D., and H. D. Bell, A.I.C. *London*, 1919.

THE PROPRIETORS OF THE JOURNAL OF BIOLOGICAL CHEMISTRY (per H. D. DAKIN, D.Sc., F.R.S., F.I.C., and A. N. RICHARDS) :

Journal of Biological Chemistry, continued.

CAMBRIDGE UNIVERSITY PRESS :

Chemistry for Textile Students. Barker North, A.R.C.S., F.I.C., and Norman Bland, M.Sc. *Cambridge University Press*, 1920.

CLOWES, FRANK, D.Sc., F.I.C. :

A Treatise on Qualitative Analysis. Frank Clowes, D.Sc., F.I.C., and J. Bernard Coleman, A.R.C.S., F.I.C. 9th Edition. *London*, 1920.

CONSTABLE & CO., LTD. :

The Manufacture of Chemicals by Electrolysis. Arthur J. Hale, B.Sc., F.I.C. *London*, 1919.

The Profession of Chemistry. Richard B. Pilcher. *London*, 1919.

DANCASTER, E. A., B.Sc., A.I.C. :

Limes and Cements: their Nature, Manufacture and Use. E. A. Dancaſter. *London*, 1919.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH :

Second Report on Colloid Chemistry and its General and Industrial Applications. *London*, 1919.

HODDER AND STOUGHTON LTD. :

Chemistry from the Industrial Standpoint. P. C. L. Thorne, B.A. *London*, 1919.

A Foundation Course in Chemistry for Students of Agriculture and Technology. J. W. Dodgson, B.Sc., A.I.C., and J. Alan Murray, B.Sc. *London*, 1920.

HODGKINSON, W. R., C.B.E., Ph.D., F.I.C. :

Die Glasfabrikation. H. E. Benrath. *Brunswick*, 1875.

JACKSON, P. G., F.I.C. :

Boiler Feed Water. P. G. Jackson, F.I.C. *London*, 1919.

JONES, E. GABRIEL, M.Sc., F.I.C. :

Chemistry for Public Health Students. E. Gabriel Jones, M.Sc., F.I.C. *London*, 1920.

KINGZETT, C. T., F.I.C. :

Popular Chemical Dictionary. C. T. Kingzett, F.I.C. *London*, 1919.

LUCAS, ALFRED, F.I.C. :

Legal Chemistry and Scientific Criminal Investigation. A. Lucas, F.I.C. *London*, 1920.

LUXMOORE, C. M., D.Sc., F.I.C. :

A collection of text-books, works of reference, English and foreign journals, and pamphlets, relating to chemistry, physics, mathematics and allied sciences, including a number of standard works still in general use and journals which have contributed towards making up the sets of the Institute.

MACMILLAN & Co., LTD. :

A Class-Book of Organic Chemistry. J. B. Cohen, F.R.S. Volume II. *London*, 1919.

NEWMAN, L. F., M.A., F.I.C., and NEVILLE, H. A. D., F.I.C. :

A Course of Practical Chemistry for Agricultural Students. Volumes I. and II. *Cambridge*, 1919 and 1920.

NORTH, BARKER, A.R.C.S., F.I.C. :

Chemistry for Textile Students. Barker North, A.R.C.S., F.I.C., and Norman Bland, M.Sc. *Cambridge*, 1920.

RIBBLE JOINT COMMITTEE :

Proceedings, 1918-19. *Preston*, 1919.

SANDERSON, JOHN, F.I.C. :

English and American scientific journals, previous contributions continued to date.

SHERRATT AND HUGHES :

Chemists' Year Book. Edited by F. W. Atack, M.Sc., F.I.C. Two volumes. *London*, 1919.

SPIELMANN, PERCY E., Ph.D., B.Sc., A.R.C.S., F.I.C. :

Some Constituents of Coal Tar and their Properties. Translated, with additions and emendations, from "Ueber seltenere und Reinpräparate aus Steinkohltheer," Weger, Zeitschrift für angewandte Chemie. Percy E. Spielmann, Ph.D., B.Sc., A.R.C.S., F.I.C. *London*, 1919.

SPON, E. & F. N., LTD. :

Chemists' Manual of Non-Ferrous Alloys. J. R. Downie. *London*, 1920.

STEVENS, H. P., M.A., F.I.C. :

The Paper Mill Chemist. 2nd Edition, revised and enlarged. H. P. Stevens, M.A., F.I.C. *London*, 1919.

STEWART, A. W., D.Sc., A.I.C.:

A Collection of Monographs, mainly in French, relating to the Chemistry of Public Health.

The Committee have also received a considerable number of pamphlets and reprints.

BOOKS PURCHASED.

- Analytical Chemistry. Volume II., Quantitative Analysis. F. P. Treadwell, Ph.D. Translated by W. T. Hall. 4th Edition. *London*, 1919.
- Annual Reports of the Chemical Society. Volumes VII. to XII., XIV. and XV. *London*, 1911—1918.
- Annual Reports on the Progress of Applied Chemistry. Volumes II. and III. *London*, 1917 and 1918.
- Economic Geology. Heinrich Ries. 4th Edition. *London and New York*, 1916.
- First Report on Colloid Chemistry and its Industrial Applications. *London*, 1917.
- Physical and Chemical Constants. G. W. C. Kaye, M.A., D.Sc., and T. H. Laby, M.A. 3rd Edition. *London*, 1919.
- Text-Book of Inorganic Chemistry. Volume IX., Part I. J. Newton Friend, D.Sc., Ph.D., F.I.C. *London*, 1920.

The Library Committee look to the Fellows and Associates for the continuance of their generous support.

The Committee will be glad to receive gifts of any of the following, which are needed to complete sets:—

<i>Publication.</i>			<i>Wanted.</i>
The Analyst	...	...	Vols. 3 and 4.
The Chemical News	...	...	Vol. 29, Nos. 748 and 754; Vol. 30, Nos. 766, 767 and 786.
The Chemical Trade Journal	...	...	Vol. 27, No. 610.
Chemiker-Zeitung	...	...	Vols. 1—17, inclusive.
Chemisches Zentralblatt	...	...	The first four series, and Vol. 1 of the 5th series.
Comptes Rendus	...	...	From commencement to 1877, inclusive and 1894 onwards.
Journal of the Board of Agriculture	...	...	From Vol. 2, Part 3, to Vol. 7, Part 3, inclusive.
Journal of the Institute of Brewing	...	...	1898 (Nos. for January and March); 1899 (No. for February).
Metallurgical and Chemical Engineering	...	...	Vols. 1—4 of the Metallographist, inclusive.
Proceedings of the Royal Society	...	...	Vols. 1—12 (1862), and Vol. 25 (1876) onwards.
Zeitschrift für angewandte Chemie	...	...	From commencement to 1898; and 1901.

Books and their Contents.

Books marked * have been presented by the authors or publishers, and may be seen in the Library of the Institute.

“Annual Report of the Director, U.S.A. Bureau of Standards.”

Pp. 298. (U.S.A. : Government Printing Office, Washington.)

“Chemistry of Coal, The.” Chemical Monograph Series.

No. VI. By J. B. Robertson, M.A., B.Sc., A.I.C. Pp viii & 96. (London : Gurney and Jackson.) 3s. 6d. net.

Classification and occurrence, origin, action of solvents ; oxidation, destructive distillation ; analysis, sampling, proximate analysis, ultimate analysis ; properties on combustion ; bibliography.

*“Chemistry from the Industrial Standpoint.” By P. C. L.

Thorne, B.A. Pp. xvi & 244. (London : Hodder and Stoughton, Ltd.) 4s. 6d. net.

Melting, freezing ; extraction of sulphur by melting ; solution ; extraction of salt by solution : crystallising ; separation of solids and liquids : types of large-scale filters ; evaporation : condensation ; separation of liquid mixtures and solutions ; separation of dust : soluble gases ; sublimation ; chemical changes ; elements and compounds : atoms and their relative weights : molecules : chemical symbols and equations ; more complex changes, winning metals from ores ; manufacture of bromine, water-gas, chlorbenzene ; double interchange : manufacture of nitre and of nitric acid from Chili saltpetre ; Leblanc process for soda ; ammonia-soda process ; elements : non-metals ; elements : metals ; oxides of non-metals and their acids ; acid hydrides : acids ; oxides of metals : alkalis : bases ; salts in general ; rate of chemical change : effect of concentration and temperature ; speeding up of changes by catalysis : contact process for sulphuric acid ; chamber process ; Deacon process for chlorine ; hydrogenation of oils ; electric current : making carbon disulphide, calcium carbide, cyanamide, etc. ; use of the electric current in decomposition ; electrolytic method of obtaining caustic soda, sodium carbonate and chlorine from salt.

*“Chemistry for Public Health Students.” By E. Gabriel

Jones, M.Sc., F.I.C. Pp. ix & 244. (London : Methuen & Co., Ltd.) 6s. net.

Use of balance ; volumetric analysis ; milk ; butter and margarine ; alcoholic beverages ; various foods, their composition and adulteration with some details of the methods of analysis ; methods of preserving foods ; water ; sewage effluents ; air ; disinfectants ; preparation of solutions.

- *"Chemistry for Textile Students." By Barker North, A.R.C.S., F.I.C., and Norman Bland, M.Sc. Pp. viii & 379. (Cambridge University Press.) 30s. net.

Introductory : physical states of matter, physical and chemical changes ; preliminary study of the atmosphere ; composition of the atmosphere ; preliminary study of water ; composition of water ; preliminary study of carbon dioxide ; elements and compounds ; systematic study of the non-metals : hydrogen ; oxygen ; classification of oxides : acids, bases and salts ; nomenclature of compounds, valency ; acidimetry and alkalimetry ; further study of water ; further study of the composition of water ; hydrogen, peroxide and ozone ; nitrogen and the atmosphere ; compounds of nitrogen ; chlorine and its compounds : sulphur and its compounds ; carbon and silicon and their compounds ; chemistry of the hydrocarbons and their derivatives : preliminary ; hydrocarbons of the paraffin series ; halogen derivatives of the hydrocarbons ; alcohols and ethers ; aldehydes and ketones ; the fatty acids ; ethereal salts or esters ; nitrogen compounds ; unsaturated hydrocarbons and their derivatives ; other organic acids used in the textile industries ; carbohydrates ; benzene derivatives ; technical textile chemistry : textile fibres ; artificial fibres ; scouring agents and detergents ; bleaching, discharging and mercerising agents ; mordanting and fixing agents ; dressing, finishing, weighting, waterproofing and fireproofing materials. Appendix : tables of vapour pressure of water, hygrometry, strengths and specific gravities of common acids and alkalis ; bibliography ; index.

- *"Coal Tars and their Derivatives: The Production of Tars from Gas Coals, Coke Ovens, Water Gas, Oil Gas, Lignite, Wood, and Peat ; the Manufacture of Pitch, Asphalt, and Bitumen ; and the Chemical Examination and Analysis of the Raw Materials and Bye-Products of the Industry." By Dr. G. Malatesta. Translated from the First Italian Edition, with Revisions, Corrections, and Additions by the Author. Pp. xii and 530. (London and New York : E. & F. N. Spon, Ltd.). 21s. net.

Historical Account. Paramount importance of the coal tar industry ; tar obtained from the manufacture of illuminating gas ; tar obtained in the manufacture of industrial coke ; tar compounds. Tar distillation ; light oil ; pitch ; distillation of lignite (brown coal) tar. Analytical : Analysis of fuels from the point of view of their bye-products.

- *"Course of Practical Chemistry for Agricultural Students, A." By L. F. Newman, M.A., F.I.C., and Prof. H. A. D. Neville, M.A., B.Sc., F.I.C. Vol. I. Pp. 235. (Cambridge University Press.) 10s. 6d. net.

Air ; hydrogen ; composition and properties of water ; carbon dioxide ; ammonia ; hydrochloric acid and chlorine ; acids ; nitric acid ; bases ;

salts; equivalents; standard solutions; metals; preliminary tests for bases; general examinations for acids; scheme of analysis adapted for a soil or a plant ash; scheme of analysis adapted for identification of manures; analysis of plants and plant ash; calcium compounds; phosphatic manures; manufactured phosphatic manures; estimation of phosphate in manures; potash manures; nitrogenous manures; organic refuse manures; farmyard manure; various physical properties of soil; retention of manures by the soil; rapid examination of a soil; mechanical analysis; properties of gases; density, specific gravity (solids); density, specific gravity (liquids); thermometers, melting and boiling points; specific heat; latent heat; surface tension and capillarity; appendix.

“Essentials of Chemical Physiology, The” (for the use of students). By Prof. W. D. Halliburton. Tenth edition. Pp. ii & 324. (London: Longmans, Green & Co.) 7s. 6d. net.

“Examination of Materials by X-rays, The.” From the Transactions of the Faraday Society. A General Discussion held by the Faraday Society and the Röntgen Society. (London: The Faraday Society.) 13s. 6d. net.

“Food: Its Composition and Preparation.” By M. F. Dowd and J. D. Jameson. Pp. viii & 173. (New York: J. Wiley & Sons, Inc.; London: Chapman and Hall, Ltd.) 6s. net.

“Food Poisoning and Food Infections.” By W. G. Savage. (Cambridge University Press.) 15s.

Food as vehicle for transmitting bacterial disease; foods inherently poisonous; idiosyncrasy; clinical and general features of outbreaks; Gaertner group of bacteria; poisoning of unspecified bacterial origin; sources and methods of inspection; botulism; chemical poisons unintentionally introduced (1) during manufacture, (2) from containers; chemical preservatives; prevention of outbreaks; methods of investigation.

*“Foundation Course in Chemistry for Students of Agriculture and Technology, A.” By J. W. Dodgson, B.Sc., A.I.C., and J. Alan Murray, B.Sc. Second edition, thoroughly revised, with new chapters. Pp. xii & 240. (London: Hodder and Stoughton, Ltd.) 6s. 6d. net.

Matter and energy; air; chief gases of the atmosphere; water; hydrogen; general principles; oxides, acids, bases, and salts; limestone; common salt; sulphur; ashes; sand and clay; compounds of nitrogen; organic matter; paraffins and their derivatives (aliphatic

compounds); natural organic compounds (aliphatic); benzene and allied compounds (aromatic compounds); notes on some of the metals; Bailliere, Tindall, and physical chemistry; appendix.

“Fuels for Power Generation, The Use of Low-Grade and Waste.” By J. B. C. Kershaw, F.I.C. Pp. x and 202. (London: Constable & Co., Ltd.) 17s. net.

Fuels: Peat, lignite, bagasse and wood waste, coke and coke breeze, culon and washing waste, towns' refuse and garbage, pitch, waste gases. Scientific control: Sampling and testing calorimetric tests, boilers and furnaces, automatic CO₂ apparatus.

“Fuel Production and Utilisation.” By H. S. Taylor, D.Sc. Pp. xvi & 297. (London: Baillière, Tindall & Cox.) 10s. 6d. net.

Direction combustion of coal; destructive distillation of coal; utilisation of coke; gasification of coal; carbonisation residuals as fuel; lignite, peat, wood; synthetic fuels.

“Fuel, Water and Gas Analysis for Steam Users.” By J. B. C. Kershaw, F.I.C. New edition. Pp. xii & 201. (London: Constable & Co., Ltd.) 12s. 6d. net.

Origin; sampling; apparatus; methods of practical application of results; calorific valuation of solid, liquid and gaseous fuels; Gontal's formula; use of fuels of low calorific value; typical tests.

“Hydrogenation of Oils, The.” Catalysers and Catalysts, and the generation of hydrogen and oxygen. By Carleton Ellis. Second edition, thoroughly revised and enlarged. Pp. xvii & 767. (London: Constable & Co., Ltd.) 36s. net.

*“Insect Life on Sewage Filters.” By W. H. Parkinson, M.D., D.P.H., and H. D. Bell, A.I.C. Pp. viii & 64. (London: The Sanitary Publishing Co., Ltd.) 3s. 6d. net.

Introduction; description of the achorutes viaticus, habits, etc.; algæ, bacteria, etc.; classification; effect on filters; experiments and effects on nitric and albuminoid nitrogen and oxygen absorption.

“Introduction to Physical Chemistry.” By Prof. James Walker, D.Sc., F.R.S., F.I.C. Eighth edition. Pp. xiii & 443. (London: Macmillan & Co., Ltd.) 16s. net.

- “Ions, Electrons and Ionizing Radiation.” By Dr. J. A. Crowther. Pp. xii & 176. (London: E. Arnold.) 12s. 6d. net.

Passage of a current through an ionised gas; properties of the gas ions; charge of an ion ionisation by collision; phenomena of the discharge tube; cathode rays and positive rays; emission of electricity by hot bodies; photo electricity; X-rays; α -rays, β and γ rays; radioactive gases; radium and its products; some problems in radioactivity; the electron theory of matter.

- “Laboratory Manual of Elementary Colloid Chemistry.” By E. Hatschek. Pp. 130. (London: J. and A. Churchill.) 6s. 6d.

Dialysis; suspensoid solids; organosols, emulsoid sols and gels; egg-albumen sol; emulsion; ultra filtration; optical methods of examination; cataphoresis; electrolytic precipitation of suspensoid sols; protection; viscosity measurements; adsorption; capillary analysis; adsorption isotherms; Liesegang phenomena.

- *“Legal Chemistry and Scientific Criminal Investigation.” By A. Lucas, F.I.C. Pp. viii & 181. (London: E. Arnold.) 10s. 6d. net.

Introduction; notes on cases; alcoholic liquors; antiquities; blood stains; building materials; bullets and other projectiles for firearms; clothing; counterfeit coins; damage to crops; documents; dust and dirt; explosives and explosions; fibres; finger prints; fires; firearms; foods and drugs; gold and silver wares; hashish; poisons; pollution of water by sewage; robbery from letters and parcels; stains and marks; string and rope; textile fabrics; tobacco; traps for criminals.

- “Life and Letters of the late Prof. Sylvanus Phillips Thompson, The.” Compiled by Jane S. Thompson and Ellen G. Thompson. (London: Fisher Unwin.) 21s. net.

- *“Limes and Cements.” By E. A. Dancaster, B.Sc., A.I.C. Pp. vii & 220. (London: Crosby Lockwood & Son.) 7s. 6d. net.

Bibliography; progress of discovery in the science connected with limes, etc.; chemistry and classification of limes; composition and origin of the rocks which furnish different kinds of lime; calcination of limestones; artificial hydraulic limes; pozzolanic and slag cements; Portland cements; varieties of Portland cement; natural cements; plaster cements; slacking of limes; sands, pozzolanas and other materials used with lime in the preparation of mortar; mortars; concrete; plastering; stuccos; waterproofing cements; bituminous and oleaginous cements; “saltpetreing” of limes, cements and plasters; chemical analysis of limes and cements; physical and mechanical tests.

- “Manganese Ores.” By A. H. Curtis. Pp. x & 118.
Imperial Institute Monograph. (London: J. Murray.)
3s. 6d. net.

Manganese ores; their occurrence, character and uses; sources of supply; references to literature.

- “Manual of Agricultural Chemistry.” By H. L. Ingle, B.Sc.
Fourth edition. (London: Scott, Greenwood & Sons.)
15s. net.

- “Manual of Dyeing, A.” By Prof. E. Knecht, Ph.D., F.I.C.,
C. Rawson, F.I.C., and R. Loewenthal. Fifth edition,
reprinted. Vols. I. and II. Pp. vii & 902. (London:
C. Griffin & Co., Ltd.) 42s. net.

Chemical technology of textile fibres; water washing and bleaching; acids, alkalis, mordants, etc.; natural colouring matters; artificial organic colouring matters; mineral colours; machinery; analysis and valuation of materials.

- “Manufacture of Intermediate Products for Dyes.” By
Dr. J. C. Cain, F.I.C. Pp. x & 273. Second edition
revised. (London: Macmillan & Co., Ltd.) 10s. net.

Benzene series; chloro and chloronitro derivatives; sulphonic acids; nitro compounds; amino compounds and diamino compounds and their chloronitro and sulphonic derivatives; benzaldehyde and its derivatives; carboxylic acids and their derivatives; pyrazolones. Naphthalene series: nitro naphthalenes; naphthalene sulphonic acid; naphthylamines and naphthylamine sulphonic acid and naphthylamine diamine sulphonic acid; naphthols; nitro-*o*-naphthol; naphthol sulphonic acid; dihydroxynaphthalene and sulphonic acids; aminonaphthol-sulphonic acids; naphtholcarboxylic acids and their derivatives; acenaphthene quinone. Anthracene series: anthraquinone and its derivatives; quinizarin and anthrarufin, methylanthraquinone and its derivatives; benzanthraquinone.

- “Mineralogy of the Rarer Metals, The.” By E. Cahen,
F.I.C., and W. O. Wootton. Second edition, revised.
Pp. xxxii & 246. (London: C. Griffin & Co., Ltd.)
10s. 6d.

Alkali metals, Bi, Ce; rare earths, La, etc.; Ga, Os, In, Mo, Nb and Ta; platinum group; radium; Sc, Se, Te, Th, Tl, W, U, V, Y, Zr; geographical distribution; assaying; analysis.

- “Monographs on Industrial Chemistry: Cement.” By
Bertram Blount, F.I.C., assisted by W. H. Woodcock and

H. G. Gillett. Pp. xii & 284. (London: Longmans, Green & Co.) 18s.

Historical; raw materials; fuel; manufacture; power; works control; testing; methods of analysis; Portland cement; function of constituents; uses; by-products; and five appendices, containing factors, tables and specifications.

“Nature of Enzyme Action, The.” By Prof. W. M. Bayliss. Fourth edition. Pp. xviii & 190. (London: Longmans, Green & Co.) 7s. 6d.

“Paper Making and its Machinery.” By T. W. Chalmers, B.A. Pp. 178. (London: Constable & Co., Ltd.) 26s. net.

Cutting, cleaning and boiling; washing, breaking and bleaching; purifying and pulping; beating; refining; Tomdrinier machine; pulp strainers; tub sizing; calendering, cutting and winding; wood-pulp; coating of art papers, finishing; coating of photographic paper.

“Physical Chemistry of the Metals.” By R. Schenk & R. S. Dea. Pp. viii & 239. (London: Chapman and Hall, Ltd.) 17s. 6d. net.

Properties of metals; metallic solution and alloys; alloys with carbides, oxides and sulphides; iron and steel; mattes; phase rule; metallurgical reaction; oxidation and reduction; carbon monoxide; blast furnace process; reaction of sulphides.

“Qualitative Analysis in Theory and Practice.” By Prof. P. W. Robertson and D. H. Burleigh. Pp. 63. (London: E. Arnold.) 4s. 6d. net.

Decomposition replacement; double decomposition; oxidation and reduction; metallic radicles, acid radicles; insoluble substances and alloys; ionic theory.

“Quantitative Analysis by Electrolysis.” By A. Classen and W. T. Hall. Revised edition. Pp. xiii and 346. (London: Chapman and Hall, Ltd.) 17s. 6d.

Introduction; electro analytical determination of Cu, Ag, Hg, Au, Pt, Pd, Rh, Bi, Sb, Sn, As, Te, Zn, Fe, Ni, Co; metals deposited as such on the cathode or as oxide on the anode; elements deposited only as amalgams; separation of metals; special analysis.

*“Report of the Fuel Research Board for the years 1918, 1919.” Department of Scientific and Industrial Research. Pp. ii & 57. (H.M. Stationery Office.) 1s. 6d. net.

Soil, The": An Introduction to the Scientific Study of the Growth of Crops. By Sir A. D. Hall. Third edition. Pp. xv & 352. (London: J. Murray.) 7s. 6d. net.

Origin; mechanical analysis; texture; tillage and movements of soil water; temperature; chemical analysis; living organisms; power of absorption; fertility; sterility; soil types; typical analyses.

*"Textbook of Inorganic Chemistry, A." Vol. IX., Part I. By Dr. J. Newton Friend, F.I.C. Pp. xvii & 367. (London: C. Griffin & Co., Ltd.) 18s. net.

General characteristics of the elements of Group VIII.; cobalt and its compounds; nickel and its compounds; ruthenium and its compounds; rhodium and its compounds; palladium and its compounds; osmium and its compounds; iridium and its compounds; platinum and its compounds; detection and estimation of the platinum metals.

"Textbook of Quantitative Analysis." By Dr. A. C. Cumming, O.B.E., F.I.C., and S. A. Kay. Third edition. Pp. xv & 416. (London: Gurney and Jackson.) 15s. net.

"Tin Ores." By G. M. Davies. Imperial Institute Monographs. Pp. x & 111. (London: J. Murray.) 3s. 6d. net.

Their occurrence, character and uses; sources of supply; references to literature.

CORRIGENDUM.

In the notice of Dr. Cain's book on "The Chemistry and Technology of the Diazo Compounds," published by Edward Arnold, which appeared in Part I. of the Journal, the price should have been mentioned as 12s. 6d. instead of 19s. 6d.



Gift — In memory of her husband, a Priestley Scholar and a Fellow and Member of Council, Mrs. Bedford McNeill has very kindly presented the Institute with a bronzed cast statuette of Priestley, a replica of the statue at Birmingham, which is here illustrated. The Council have gratefully accepted the gift and, in conveying their thanks to Mrs. McNeill, have expressed their additional pleasure in receiving it, because the figure was adopted, with the consent of the sculptor the late Mr. Francis John Williamson, as the main feature in the design of the seal of the Institute.



CHARLES EDWARD GROVES, F.R.S

Secretary : 1877—1887 ; Registrar and Secretary : 1887—1892

Obituary.

PHILIP ANDERSON ESTCOURT, who died at Old Trafford on November 20th, 1919, aged 53 years, was the son of Mr. Charles Estcourt, City Analyst for Manchester. He was associated in practice with his father for about 37 years, except for a period of about three years during which he was Chemical Assistant on the staff of the London County Council. He was Deputy Public Analyst for Manchester for several years prior to 1908, when owing to failing health he was obliged to proceed to New Zealand, where he remained until shortly before his death. He was elected a Fellow of the Institute in 1894.

WALTER WILLIAM FISHER died at Oxford on February 7th, 1920, in his 78th year. He graduated in the University of Oxford and in 1872 was appointed Aldrichian Demonstrator in Chemistry at Corpus Christi College in succession to Mr. T. H. Wyndham. He held appointments as Public Analyst to the counties of Berks, Bucks, and Oxon, the boroughs of Aylesbury, Banbury, and Oxford City, and as Official Agricultural Analyst for Oxford County and City. He was a Past President of the Society of Public Analysts, served as a member of the Council of the Institute for three periods, and was Examiner in the Chemistry of Foods and Drugs from 1903 to 1907.

He was elected a Fellow of the Institute in 1888.

CHARLES EDWARD GROVES, an Original Fellow of the Institute, died at Kennington Green, on February 1st, 1920, in his 79th year. Born at Highgate, he was educated at Brixton College, and received his training in chemistry at the Royal College of Chemistry under Hofmann. He became Senior Assistant to Dr. John Stenhouse, F.R.S., and was engaged with him, for some years, in organic research—much of which was published in the *Transactions of the Chemical Society*—at a private laboratory in Rodney Street, Pentonville, where he continued until Dr. Stenhouse's death in 1880. He took an active part in the foundation of the Institute, was a member of the three organisation committees, was first Secretary from 1877 to 1887, Registrar and Secretary from 1887 to 1892, and a Vice-President from 1892 to 1895. In 1880, he was appointed Lecturer in Chemistry at Guy's Hospital, from which appointment he retired in 1901. He was also Editor of the *Journal of the Chemical Society* from 1884 to 1889 in succession to Henry Watts. For over twenty years he was Chemical Adviser and Analyst to the Thames Conservancy, from which position he retired in 1909. He is said to have introduced the use of india-rubber corks in laboratory work and to have originated the *glass* Liebig condenser. He edited "Calvert's Dyeing and Calico Printing," two volumes of "Miller's Chemistry," and two volumes of "Fresenius' Analysis"; and was joint author with William Thorp of two volumes on Chemical Technology. He was elected a Fellow of the Royal Society in 1883, and was a Past Member of Council and Past Vice-President of the Chemical Society.

At his funeral, which took place at Streatham Cemetery, the Institute was represented by the Registrar.

Changes in the Register.

At the meetings of the Council held on January 23rd and February 27th, 1920, 4 new Fellows were elected ; 7 Associates were elected to the Fellowship ; 31 Associates were elected ; and 142 Students were admitted.

The Institute has lost 2 Fellows by death.

S. = Naval, Military, or Air Service. M. = Munitions.

New Fellows (By Examination).

Beach, Frederick Frank, M.A. (Oxon), B.Sc. (Lond.), 18, Prince Street, Bristol.

Brook, George Bernard, The White Lodge, Dore, near Sheffield.

New Fellows.

Coulthard, Albert, B.Sc. (Vict.), Ph.D. (Freiburg). The Airds, Bennett Road, Crumpsall, Manchester. [Research Chemist, British Dyestuffs Corporation, Ltd.]

Eyre, John Vargas, M.A., Ph.D. (Leipzig), La Quinta, Wye, Kent. [Finsbury Tech. Coll. Dip. ; Director of Research, Linen Industry.]

Associates Elected to Fellowship.

Brannigan, Peter Joseph, D.Sc. (Q.U.B.), 137, Springfield Road, Belfast.

Bullock, Edmund Rayner, B.Sc., A.R.C.S. (Lond.), The Eastman Kodak Co., Kodak Park Works, Rochester, N.Y., U.S.A.

Foster, Henry Stennett, 21, Fitzwilliam Street West, Huddersfield.

Goddard, Ernest Donald, B.Sc. (Lond.), 37, Alwyn Avenue, Chiswick, London, W. 4.

Haythornthwaite, Alan, B.Sc., A.R.C.S. (Lond.), 62, North Side, Clapham Common, London, S.W. 4.

Ingham, John William, Heriot-Watt College, Edinburgh.

Mather, Ewart, B.Sc. (Lond.), Ruabon Chemical Works, Ruabon.

New Associates (By Examination).

- Barber, Harold Hayden, B.Sc. (Lond.), 38, Vicarage Avenue, Derby.
 Haycock, John, Hill Top House, Great Glen, near Leicester.
 McHatton, Laurence Patrick, A.R.C.S., 30, Hotham Road, Putney, London, S.W. 15.
 Sparling, Miss Ellen Emma, Brooke House, Brooke Street, Holborn, London, E.C. 1.
 Whalley, Hubert Charles Siegfried de, The Laboratory, The Molassine Co., Ltd., Tunnel Avenue, Greenwich, London, S.E. 10.

New Associates.

- Alexander, Thomas Stuart, B.Sc. (Manc.), The School House, The Avenue, Cirencester, Glos. [S.]
 Becker, Frederick Oscar Pitt, A.R.C.S. (Lond.), 42, Victoria Avenue, Surbiton, Surrey. [Research.]
 Boardman, William, c/o William Blythe & Co., Church, Lancs. [Tech. School, St. Helens; Liverpool Univ.; S.; M.]
 Burgess, Henry, B.Sc. (Birm.), Calverhall, Whitchurch, Salop. [M.]
 Cashmore, Albert Eric, B.Sc. (Birm.), Gladstone Road, Dorridge, near Birmingham. [S.; M.; Research.]
 Clulow, Frederick Stanley, A.R.C.S., 67, Platt's Lane, Hampstead, London, N.W. 3. [S.; Research.]
 Cooper, Cecil Hamer, B.Sc. (Manc.), Hawk House, King Street, Oldham, Lancs. [S.]
 Daniels, Richard George, B.Sc. (Lond.), A.R.C.S., 5 Peterborough Villas, Fulham, London, S.W. 6. [S.; Research.]
 Green, Captain John Russell, M.C., B.Sc. (Lond.), 18, Goring Road, Llanelly, S. Wales. [S.]
 Hill, Miss Ellen Susan, B.Sc. (Lond.), 30, Rylands Road, Beeston, Notts. [Research.]
 Husband, Alfred Dudley, Four Mile House, Bucksburn, Aberdeen, N.B. [Toronto Tech. School; Univ. Coll., London and Toronto. Univ.; S.; Research.]
 King, James Lawrence, B.Sc. (Lond.), 41, Wembdon Road, Bridgwater, Somerset. [S.]
 Lewis-Dale, Percy, B.Sc. (Lond.), 157, Ruskin Road, Crewe. [Manchester Coll. of Technology; Analytical Chemist, L. & N.W. Ry. Co.]
 Lindsay, Miss Johan Dunlop, B.Sc. (Aberd.), 77, Beaconsfield Place, Aberdeen. [Admiralty.]
 MacDougall, Duncan, A.R.T.C., 9, Yarrow Gardens, Kelvinside, N., Glasgow. [S.]
 Mann, Donald, B.Sc. (Lond.), c/o Mrs. Buchan, Garthland, Eglinton Place, Saltcoats, Ayrshire. [S.]

- Mann, Frederick George, B.Sc. (Lond.), 21, Thurlby Road, West Norwood, London, S.E. 27. [S.]
- Mason, Captain Horace George, M.B.E., B.Sc. (Vict.), R.E. Experimental Station, Porton, Wilts. [S. ; Research and Inventions.]
- Oates, Frank, M.B.E., B.Sc. (Lond.), 5, Langside Avenue, Putney, London, S.W. 15. [S. ; M.]
- Reeves, Harry Gordon, B.Sc. (Birm.), 48, Devonshire Road, Handsworth Wood, Birmingham. [Research.]
- Rhead, Thomas Fred Eric, M.Sc. (Manc.), Fair Holme, Malvern Road, Acocks Green, Birmingham. [Research ; Publications.]
- Roach, William Arthur, A.R.C.S. (Lond.), Rothamsted Experimental Station, Harpenden, Herts. [S. ; Research.]
- Saunders, Captain Kenneth Herbert, B.Sc. (Lond.), St. John's College, Cambridge. [S. ; M. ; Research.]
- Shearcroft, Walter Francis Fairfax, B.Sc. (Lond.), King's School, Peterborough. [M.]
- Smith, John, B.Sc. (Glas.), 31, Dempster Street, Greenock, Scotland. [Asst. to Prof. of Chemistry.]
- Smith, Louis Gregory, The Brewery, Falkirk. [Univ. Coll., Dundee ; Heriot-Watt Coll., Edinburgh ; M.]
- Stansfield, William James, A.R.C.S., 23, Bell Hall Terrace, Savile Park, Halifax. [Deputy Head, Chemistry and Dyeing Dept.]
- Thomson, William Lockerbie, B.Sc. (Edin.), 34, Craighouse Avenue, Edinburgh. [Research.]
- Tribley, Harold George, High Street, Yetminster, Sherborne, Dorset. [Finsbury Tech. Coll. Dip. ; S.]
- Watson, George Marwood, A.R.C.S., B.Sc. (Lond.), 115, Hainton Avenue, Grimsby, Lincs. [M. ; Research.]
- Williams, William Henry, M.A. (Cantab.), 6, Belgrave Road, Leyton, London, E. 10. [Royal Mint.]

CORRIGENDUM.—In the list of new Associates notified in the Journal, Part I., the word " Research " should have been added to the entry of T. C. Kenny.

New Students.

- Allam, Joseph Dobson, Lynton, Heathcote Grove, Chingford, London, E. 4
- Armour, Miss Janet Foote, 55, Gardner Street, Partick, Glasgow.
- Armour, John, 55, Gardner Street, Partick, Glasgow.
- Atherley, Samuel Walter, 86, Front Street, Arnold, Notts.
- Back, Sydney, 179, Belsize Road, Kilburn, London, N.W. 6.
- Bains, Leslie, 5, Carlton Road, Stroud Green, London, N. 4.
- Bakewell, Ernest, 9, Woodhouse Street, Nottingham.

- Bates, Henry Hutchinson, 179, Spring Vale Road, Sheffield.
- Baylis, Charles Edmund, 13, Bridge Road, East Ham, London, E. 6.
- Bellerby, Charles William, Downing College, Cambridge.
- Biggs, Sidney Harold, 15a, Rockmount Road, Plumstead, London, S.E. 18.
- Bostock, Alfred, 17, Byron Street, Ilkeston, Derbyshire.
- Boyes, George Richardson, 61, Balham Hill, London, S.W. 12.
- Branch, Leslie Ernest Thomas, 200, Cranbrook Road, Ilford, London, E. 1.
- Brazier, William Ernest, 71, Waterloo Promenade, Forest Road, Nottingham.
- Brow, William Thomas, 12, Ryehill Place, Leith, Scotland.
- Brown, Derek Goudie, 77, Mount Annan Drive, Cathcart, Glasgow.
- Burdett, Arthur Ernest Dixon, Meadow Croft, Burkes Road, Beaconsfield, Bucks.
- Byron, John Percy, 7, Pavilion Road, West Bridgford, Notts.
- Callingham, William Ernest, 11, Matthews Street, Battersea, London, S.W. 11.
- Carter, John Stanley, Holly Farm, Farnley, Leeds.
- Clayton, Cyril James, 21, Upper Westbourne Terrace, Hyde Park, London, W. 2.
- Coffey, Samuel, 67, Palin Street, Hyson Green, Nottingham.
- Cole, Frederick, Prospect Place, Howden-le-Wear, Co. Durham.
- Cook, James Wilfred, 6, Showbury Road, Fulham, London, S.W. 6.
- Corbet, Alexander Steven, Abbeystone House, Sidmouth Street, Reading.
- Courtney, William Barry, 12, Caithness Road, Mitcham, Surrey.
- Creasy, John James, 18, Kohat Road, Wimbledon, London, S.W. 19.
- Cressingham, John Harold, 29, Longbridge Road, New Barking, Essex.
- Currie, Robert Matthew Hamilton, Ashbourne, Barterholm, Paisley.
- Dawson, George Alexander, Salisbury House, Campsie Glen, near Glasgow.
- Dodds, Gilbert Elliot, Allerton, Liberton, Midlothian, Scotland.
- Dow, William Thornton, The Cottage, Gilmerton, Midlothian, Scotland.
- Doxey, Frederick William, 51, Gore Road, Merton, London, S.W. 19.
- Driver, John Edmund, 43, Dovecot Lane, Beeston, Notts.
- Eaton, Frederick John, 2, Atholl Place, Edinburgh.
- Egan, James Patrick, Clydemount, Hyde Road, Gorton, Manchester.
- Elliott, George Robert, 27, Lady Bay Road, West Bridgford, Nottingham.
- Emmott, Sidney, 37, Main Street, Crosshills, near Keighley.
- Evans, Benjamin Beardmore, 48, Oakwood Road, Sparkhill, Birmingham.
- Evans, Miss Dorothy, Longcroft, Oakerthorpe, Alfreton.
- Foster, Frank, Station Road, Brockholes, Huddersfield.
- French, Herbert, 9, Shadow Place, North Merchiston, Edinburgh.
- Garrie, David Nicol, 3, Tullibody Road, Alloa, Scotland.
- Glen, William, Woodleigh, Murray Street, Paisley.
- Goodman, Lewis, Hilleston, Cleanthus Road, Shooters Hill, London, S.E. 18.
- Griggs, Edward Walter, 141, Capel Road, Forest Gate, London, E. 7.
- Grundy, James Gibson, 4, Henry Street, Bolton, Lancs.
- Halliwell, Tom, Eaglehurst, Bracken Road East, Brighouse.

- Hallum, William, 75, Mill Street, Rutherglen, Lanarkshire.
Hart, Leslie Ralph, Beaulieu, St. Albans, Herts.
Hatfield, John Smith, 30, St. George's Court, Gloucester Road, London, S.W. 7.
Hawley, James, Montague House, 67, Millhill, Musselburgh.
Hayes, Sydney Richard, Rutland, 19, Woodbrooke Road, Bournville, Birmingham.
Hewis, Harold Wilton, 819, Hucknall Road, Nottingham.
Hickman, George, 83, Gladstone Road, Sparkbrook, Birmingham.
Houghton, Arthur Sereld, 7, Lincoln Street, Chelsea, London, S.W. 3.
House, Cecil John, 132, Hailsham Avenue, Streatham Hill, London, S.W. 2.
Howes, Herbert Stanley, Belle Monte, Devizes, Wilts.
Hulme, Henry Cecil, 29, High Street, King's Heath, Birmingham.
Jamieson, Morris, 14, Deerpark Gardens, Tollcross, Glasgow.
Jarrett, Wilfred Thomas, 124, East Street, Sittingbourne, Kent.
Jeffrey, John George Alexander, 14, Cumberland Street, Edinburgh.
Johnston, James, 80, Balgreen Road, Edinburgh, W.
Kapur, Purushottam Das, c/o Messrs. Thomas Cook & Son, Ludgate Circus, London, E.C. 4.
Kershaw, Fred Greenwood, 75, Cranbourne Road, Waterloo, Ashton-under-Lyne, Lancashire.
Knights, Edward Donovan, 197, Upper Dale Road, Derby.
Litchfield, Arthur Frank Darwin, 10, Knyveton Road, Bournemouth.
Louden, Charles Robertson, 4, South View, Dalmuir, Dumbartonshire.
Lowe, George Morris, 4, Kyverdale Road, London, N. 16.
Macnair, Peter Mackenzie, 37, Lawrence Street, Partick, Glasgow.
Madden, Frank Cox, 8, Merton High Street, Wimbledon, London, S.W. 19.
Marson, Cecil Brittain, 157, Murray Road, Rugby.
Matthews, Geoffrey Charles, 31, Stapenhill Road, Burton-on-Trent.
McCarter, Geoffrey Lailey, 34, Milford Road, Great Lever, Bolton, Lancs.
McCartney, William, 5, Mortonhall Road, Edinburgh, Scotland.
McDonald, Alexander, 1399, Argyle Street, Glasgow.
McGeorge, Walter, 707, Govan Road, Glasgow.
McKenzie, William, Mayfield, Dalratho Road, Grangemouth.
Mernagh, Laurence Reginald, 6, Grosvenor Road, Highbury, London, N. 5.
Merrylees, James Simpson, 167, Glasgow Street, Ardrossan, Ayrshire.
Millar, William Harry, 606, Alexandra Parade, Glasgow.
Mitchell, Thomas Corlett, Templehall Buildings, 168, Quarry Street, Hamilton, Scotland.
Moir, Hugh C., 7, Craigrelen Street, Dennistoun, Glasgow.
Moore, Quintin, Garrowbank House, Riddrie, Glasgow.
Neilsen, Edgar Axel, 16, Beechfield Street, Cheetham, Manchester.
Newbound, Reginald, Ivy Villa, Chatham Street, Newark-on-Trent.
Nisbet, Hugh Bryan, 3, Maurice Place, Edinburgh.
Overell, Frank Herbert, 107, Florence Road, Wimbledon, London, S.W. 19.

- Parsons, Ian Herbert, 54, Queen Anne Street, London, W. 1.
 Pearce, Cecil Charles, Sunny Croft, Wotton-under-Edge, Glos.
 Phillips, Cyril Henry John Vezey, 190, Algernon Road, Lewisham, London, S.E. 13.
 Phillips, Lewis Henry, 2, Adys Lawn, London, N.W. 2.
 Pickering, Eric Charles, B.Sc. (Lond.), 35, Alexandra Avenue, Mansfield, Notts.
 Potter, Ernest Leslie, 28, Brookfield, West Hill, Highgate, London, N. 6.
 Pugh-Jones, Cecil Owen, 15, Colchester Avenue, Cardiff.
 Ray, William John, 5, The Crescent, Boscombe, Hants.
 Read, Alfred Leonard, Tiptoe, Hordle, near Brockenhurst, Hants.
 Read, Edwin Valentine, 1, Liberia Road, Highbury, London, N. 5.
 Reid, John Wardlaw, 96, Howson Road, Brockley, London, S.E. 4.
 Renton, Archibald, 2, Bonaly Road, Edinburgh.
 Ridge, Bert Pusey, Bodicote, Banbury, Oxon.
 Ritchie, Peter Aitken, 4, Montagu Terrace, Edinburgh.
 Rixon, Frederick, 10, Croxley Road, Maida Hill, London, W. 9.
 Robertson, Alexander, M.A. (Aberd.), Charlesfield, Turriff, Aberdeenshire.
 Robins, William George, 51, Pershore Road, Edgbaston, Birmingham.
 Rushworth, James, 11, Smithy Carr Lane, Brighouse, Yorkshire.
 Seal, Ralph John, 14, Woodend, Sutton, Surrey.
 Shaw, Brian Duncan, Fern's Hollow, Station Road, Ilkeston, Derbyshire.
 Shaw, Richard Arthur Barnsley, 3, Earl's Court Square, London, S.W. 5.
 Shrewsbury, Richard Arnold, 2, Radnor Avenue, Harrow.
 Smith, George Henderson, M.C., Crindledyke Cottage, Newmains, Lanarkshire, Scotland.
 Smith, James Clark, Abbotsford, 16, Empress Avenue, Wanstead Park, London, E. 12.
 Smith, Wilfred, 76, Noel Street, Nottingham.
 Snodgrass, George Archibald, 11, Victoria Crescent, Dowanhill, Glasgow.
 Snow, Frederick Henry, 57, Cobham Road, Kingston-on-Thames.
 Speedy, Alan, 81, Burgess Road, East Ham, London, E. 6.
 Steel, James King, 2, South Park Drive, Paisley.
 Stevens, Stanley, 114, St. Peter's Road, Leicester.
 Tadman, Vernon Thorpe, 189, Woodboro' Road, Nottingham.
 Tamplin, Morgan James, Wolfville, Nova Scotia, Canada.
 Taylor, George, Brook Cottage, Matlock Green, Derbyshire.
 Taylor, George Vincent, 1, Glen Dene, Langdale Road, Heaton Chapel, Stockport.
 Thomas, Garfield, 20, College Street, Aberdare, South Wales.
 Thomas, Harold Hirst, 69, Blackman Lane, Leeds.
 Thompson, George, Ballykennedy, Dandrod, Crumlin, Co. Antrim.
 Thomson, Archibald, 7, Lochlea Road, Newlands, Glasgow.
 Todd, Eric, 8, School View, Hyde Park, Leeds.
 Todd, William Millan, Ferndene, Blinkbonny Road, Falkirk.

- Trace, Leslie Herbert, 2, Victoria Mansions, Grange Road, Willesden Green, London, N.W. 10.
- Trescot-Brinkworth, Denis John, 83, Highbury New Park, Highbury, London, N. 5.
- Warburton, Eric, 57, Hornsey Rise Gardens, Crouch End, London, N. 19.
- Watson, David, 118, Onslow Drive, Dennistoun, Glasgow.
- Watson, David Lindsay, 81, Montgomery Street, Edinburgh.
- Webster, James D., 39, Partickhill Road, Glasgow, W.
- West, Walter, 32, Oakfield Grove, Bradford.
- Williams, Kenneth Edward Nethercoate, 64, Kingsgate Street, Winchester.
- Wood, Alexander, 35, Tynemouth Road, London, N. 15.
- Wylie, Andrew Robertson, Langlands, Bridge of Allan, Stirlingshire.
- Yates, Eric John Cabena, The School House, Silverdale, N. Staffs.
- Young, James Pollock, 9, Anchor Place, Bellshill, Lanarkshire.
- Young, William, 12, Keith Road, Hayes, Middlesex.

CHANGE OF NAME.

Medofski, Samuel (Associate), to Medsforth.

DEATHS.

Fellows.

Fisher, Walter William, M.A. (Oxon.).

Groves, Charles Edward, F.R.S.

Alteration for Register.

The Register of Associates should contain two entries as follows —

1918. Wallace, Thomas, M.Sc. (Dun.), c/o The Castner-Kellner Alkali Co., Ltd., Wallsend, Northumberland.
1918. Wallace, Thomas, M.Sc. (Dun.), University of Bristol, Research Station, Long Ashton, near Bristol (Captain, R.E., M.C.).

To the entry of the name of Sidney Augustus de Lacy, *add* 2nd Lieut., Lancashire Fusiliers.

To the entry of the name of Donald Major Wilson, *add* Twice mentioned in despatches.

General Notices.

Examinations.—The Council give notice that Examinations will commence on July 12th. The list of candidates will be closed on Thursday, June 3rd, 1920.

Candidates who intend to present themselves can obtain further information from the Registrar.

Notice to Associates.—Associates elected prior to April, 1917, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain forms of application for election to the Fellowship.

Appointments Register.—A Register of Fellows and Associates of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

The Library.—The Library is open for the use of Fellows, Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays: 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is also available for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 A.M. to 9 P.M. on week-days (Saturdays from 10 A.M. to 5 P.M.).

THE
INSTITUTE OF CHEMISTRY
OF
GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.

1920.

PART III.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER,
Registrar and Secretary

30, RUSSELL SQUARE, LONDON, W.C. 1.
June, 1920.

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Editorial.

The Training of Chemical Assistants.

THE Nominations and Examinations Committee, in the course of their work during the past few years, has been impressed by the proportion of candidates who have not received any systematic university or college training and yet have attained positions of responsibility in industrial undertakings. Further, the Committee found that comparatively few of such candidates had proved themselves efficient chemists in the broad sense, but many, often with a somewhat inadequate understanding of the principles underlying their everyday practice, had become mere adepts in their own special branch of work, usually covering a restricted experience.

It appears that manufacturers and employers have been, in the first instance, too apt to engage young untrained or only partly trained assistants. In the course of time many such assistants have been promoted without regard to their fitness for higher positions, and, the process being repeated, staffs of men of similar calibre have arisen in many quite important industrial concerns, the directors being unaware that such a method of scientific control was not to their own advantage, nor in the real interest of their technical employees. Clearly, progress, in the application of science to industry, will not be accelerated in such concerns until the directors learn to look for the services of highly-trained and competent men.

Arising from these considerations, the question of the position of untrained chemical assistants requires to be reviewed. For many years such assistants have competed, to the detriment of the profession as a whole, with those who have devoted time and money to systematic preparation for their profession,

in which category are included those who have supplemented the experience gained in their daily work by attendance at evening classes covering a course equivalent to a three years' day course in chemistry and allied subjects. For the remainder, who have picked up what they could, without such instruction in their main science, with none in the collateral sciences and with usually only an elementary general education at the outset, the result has been that they have found themselves in a calling with limitations, disappointing both as to scope and emoluments. The position has arisen partly through ignorance and inertia on the side of the assistants, but in some measure through apathy on the side of the employers. Had such assistants been properly advised, and exerted themselves accordingly, many would no doubt have done credit to their calling and have become of greater value to their employers ; on the other hand, the employers, including some qualified chemists, have taken young men into their laboratories with no intention of making them fit to be more than testers, and that in a very limited range of work. Further, the system under which, in the past, premium pupils have been taken, without the principals giving an undertaking to put them in the right road towards qualification, is strongly to be deprecated.

If the position of the profession as a whole is to be maintained and promoted, every youth who hopes to become a chemist should, in the first place, have matriculated or have passed an examination of analogous standard, or have an early prospect of passing such an examination, as a preliminary step to qualification. In a few industrial concerns this requirement has now become a *sine qua non* to employment in the works' laboratory. It should be regarded as essential in all chemical laboratories that all except laboratory attendants, and these also if they hope to become chemists, should be required to improve their general education to an equivalent standard before promotion to work of any responsibility.

To deal with this problem the Council of the Institute have appointed a Sub-Committee to advise upon the training and

employment of chemical assistants. This Sub-Committee will place the requirement of a reasonable standard of general education in the forefront of its recommendations.

The Sub-Committee propose to obtain information with regard to existing schemes for the training of chemical assistants in the laboratories of large industrial concerns and elsewhere, and to formulate a scheme which should afford all youths entering on a career in chemistry a prospect of advancement ; always providing that they take steps, if they have not done so, to attain the necessary standard of general education and are willing to accept the arrangements made by their employers for their attending courses in chemistry, physics, and allied sciences, in systematic preparation for a recognised qualification. It will be recommended, moreover, that those who do not attain the necessary standard of general education, or make satisfactory progress in their technical training, should be discouraged before it is too late from continuing in laboratory work and should be taken on to the operative side of the works or advised to turn to some other calling.

Attention is also drawn to the fact that the Regulations of the Institute provide for admission to the Associateship of candidates who, having passed an approved preliminary examination, have completed an approved evening course in the necessary subjects, extending over at least five years, have passed the class examinations, have been engaged in chemical work during the day throughout that period, and are recommended by their teachers as suitable for admission to examination.

As an essential part of the organisation of the profession, the Council of the Institute hold that chemical assistants should not be styled "chemists" until they have become qualified. This was a point upon which stress was laid in the scheme of Government Chemical Service, published by the Institute early in 1919, and a more general observance of it in industry, by according such recognition only to the properly qualified, should afford to chemical assistants a stimulus to higher qualification. It should also tend to lessen the con-

fusion of ideas which exists with regard to the use of the word "chemist," since the difficulty will be less accentuated as the term comes to be applied strictly to "chemists" according to the custom of all other countries where analogous terms are in use. In any case, the proper use of the word "chemist"—from the point of view of the Institute—will not be promoted until chemists themselves employ it solely to describe those who are competent and qualified to practise in the profession of chemistry.

This opportunity is taken of stating that many applications for membership of the Institute are declined because candidates have had no training in, for example, organic chemistry or physics. Fellows are asked, therefore, when replying to inquiries respecting applications, to bear in mind that every candidate must be a *chemist*, with a sound grounding in the principal branches of his subject—inorganic, organic and physical—and must have an adequate knowledge of physics, mathematics, and one other cognate science, while he should also have a working acquaintance with German and at least one other foreign language.

The Registrar of the Institute has been appointed a member of a Committee of the Ministry of Labour, Employment Department, in co-operation with the Incorporated Association of Headmasters. This Committee is mainly concerned with finding employment for boys from secondary schools. The Institute has received from the Committee the names of a number of youths who have passed the London Matriculation Examination and are desirous of entering laboratories to gain experience in chemistry, with a view to preparation by evening classes for the degree of B.Sc. (Lond.) and eventually A.I.C. Members who are able to assist in placing such youths in suitable vacancies are invited to communicate with the Registrar.

Proceedings of the Council.

(April—May, 1920.)

War Memorial: Benevolent Fund.—A War Memorial, in bronze and oak, showing the names of Members and Students who died in the service of their country during the War, has been placed in the entrance hall of the Institute, and will be unveiled on the earliest suitable occasion.

As a further memorial the Council have resolved to establish a Benevolent Fund.

Although hitherto there has been no such Fund, the occasions on which a personal appeal has been made to a few members have been fairly frequent. On some such occasions a sum has been raised by private subscription for the benefit of the widow of a deceased member, or to assist a member temporarily or permanently incapacitated from practice, but such appeals have fallen mainly on the more intimate friends of the members concerned. In other instances, through the generosity of a few Fellows, the Registrar has administered a fund in relief of temporary distress. The disbursements thus made during the past ten years have amounted to £215 2s. 6d. The balance of this fund, including a donation recently received, amounts to £51 17s. With this amount, and a sum of £200 already contributed by the members of Council and of the Benevolent Fund Committee, an account has now been opened with the bankers of the Institute.

The solicitors of the Institute agree that, while this scheme may not fall strictly within the functions of the Institute, and is not an object towards which it may apply its general funds, it is certainly within its chief aim, namely, the maintenance of the dignity and welfare of the profession of chemistry.

For the present the fund will be administered by the Council of the Institute on as simple a basis as possible for the benefit of Fellows, Associates, and their dependants, the Council being at liberty at any time to extend its objects

as funds allow. A Benevolent Fund in connection with the Institute should afford a further bond of human interest between the members. All who have experience in such matters are aware, however, that the most deserving cases are often overlooked through ignorance of the existence of such a fund, or through diffidence on the part of those most intimately concerned; but the Council and the Benevolent Fund Committee look to the Fellows and Associates generally, and the Committees of Local Sections particularly, to bring such cases to their notice, in order that the Institute may be the means of affording assistance where necessary. Had such a fund been inaugurated sooner, the need for it would probably have been more clearly demonstrated, and the fact that such a fund now exists will no doubt bring to light from time to time cases of distress which would otherwise remain overlooked.

Contributions may be forwarded at any time to the Registrar. Cheques and postal orders should be made payable to "The Institute of Chemistry Benevolent Fund," and crossed "London County, Westminster and Parr's Bank, Bloomsbury Branch."

The scheme is as follows:—

INSTITUTE OF CHEMISTRY BENEVOLENT FUND.

Founded 1920: As a memorial to Fellows, Associates and Students who died in the service of their country, 1914—1918.

Object.

The object of the fund shall be to help necessitous persons who are, or have been, Fellows or Associates of the Institute of Chemistry (whether subscribers to the fund or not), their wives and children, and widows or dependent relatives of deceased Fellows or Associates.

Rules.

1. The fund shall be raised by voluntary donations and subscriptions, which may be made at any time, and shall be administered by the Council of the Institute, who shall appoint

an Executive Committee (consisting not entirely of members of the Council), to be known as the Benevolent Fund Committee, to be elected at the first meeting of the Council after the Annual General Meeting in each year.

2. The Benevolent Fund Committee shall consist of not less than twelve members ; three to form a quorum.

The Benevolent Fund Committee shall, subject to the provisions of Rule 6, consider all applications for assistance, and report to the Council with such recommendations as they may deem fit.

3. Grants in aid may take the form of single payments, annuities, provision for the education of children, or other assistance approved by the Council, and shall be in the sole discretion of the Council, whose decision as to granting or refusing aid, and the amount and conditions under which such aid is granted, shall be final.

4. Applications for grants in aid shall be made on forms to be obtained from the Registrar. Such forms shall state the age of the applicant, his or her connection with the Institute, and present means of subsistence, and shall supply such particulars and evidence as the Council may require. All applications shall, subject to the provisions of Rule 6, be considered by the Benevolent Fund Committee at the earliest opportunity.

5. In any case of urgent necessity the Benevolent Fund Committee shall have power to make an immediate grant not exceeding a total of £10.

The Registrar of the Institute shall also be authorised to make a grant in any similar case not exceeding a total of £5, and shall report all such grants to the next meeting of the Benevolent Fund Committee.

All disbursements in such cases shall be reported to the Council.

6. The Benevolent Fund Committee may consult the Local Sections of the Institute and their Committees, and ask for their advice and assistance with regard to cases arising within their respective districts.

7. Monies not required immediately for the purposes of the fund may be invested at the discretion of the Council in duly authorised trustee securities under the seal of the Institute for and on behalf of the Institute of Chemistry Benevolent Fund. The dividends derived from such investments shall be allocated to the income of the fund. It shall be competent to the Council to realise or vary such investments as and when they think fit, for the purposes of the fund. All legacies bequeathed to the fund shall be invested.

8. The Benevolent Fund Committee shall prepare a statement of the accounts of the fund up to December 31st each year, and submit the same to the Council for publication in the Journal of the Institute. Such statement shall be certified by a chartered accountant, to be appointed by the Council at the first meeting held after the Annual General Meeting in each year.

9. The rules of the fund for the time being in force may be altered, added to, or rescinded by the Council as and when they deem fit by a majority of three-fourths of the members present at a meeting convened with due notice of that purpose.

10. In the event of it being found necessary from any cause to wind up the affairs of the fund, any amount outstanding to the credit of the fund shall be applied to an object of similar character.

Finance.—A policy has been completed with the Sun Insurance Office for the redemption of £50,000 at ninety years, and at an annual premium of £110 8s. 4d., having in view the fact that the lease of the Institute expires in 2012. It is held by the Council that a redemption fund is a desirable method of creating a reserve for future contingencies, and this view was endorsed by the members present at the Annual General Meeting. The Finance Committee thought it advisable, however, that an inquiry should be addressed to the ground landlord regarding the possibility of purchasing the freehold of the site of the Institute, and, in that event, the cost. The Council then learned that the site was included in that offered by the Government to the University of London.

The matter is still undecided, but the Council feel confident that the interests of the Institute will not suffer.

The question has been raised whether a reduction might be allowed in the amount of the annual subscription of Members residing outside the United Kingdom. In view of the fact that between four and five hundred Members would come under that category, the Council regret that it would not be possible to make any concession to such Members.

General Purposes Committee.—The General Purposes Committee have received the revised By-laws from the solicitors, and they have since been under the consideration of a Sub-Committee, consisting of Mr. Horatio Ballantyne, Dr. J. T. Dunn, and Mr. George Stubbs. The draft will again be reviewed by the General Purposes Committee before it is submitted to an Extraordinary General Meeting of the Institute.

Income Tax.—In Part II. of the Journal it was mentioned that the General Purposes Committee had considered a proposal received from the Commissioners of Income Tax with reference to the application made by the Council for an abatement to be allowed to members of the Institute in respect of their annual subscriptions. The Commissioners proposed entering into an agreement with the Institute whereby private practitioners could secure such abatement, provided the tax were paid by the Institute, but stipulating that such abatement should not apply in the case of members holding whole time appointments. The proposed agreement did not appear, therefore, to be to the advantage either of the Institute or of the members concerned, and the Council decided that it should not be entertained. The Council have, however, given their support to a Memorial prepared by representatives of the Institute, the National Union of Scientific Workers, the British Association of Chemists, and other bodies which it is proposed to submit, on behalf of scientific workers generally, to the Lords of the Treasury, with regard to securing abatement in respect of subscriptions to societies,

libraries, and periodicals ; purchase of technical books, instruments, etc. ; rent and expenses of private laboratory and or of study ; travelling and other expenses incurred in attending scientific meetings ; provision of special clothing for work and renewal of clothes damaged in the course of employment ; and other expenses incurred in the course of research.

The General Purposes Committee have also considered a question raised by a Fellow with regard to a proposal to assess for purposes of income tax the proceeds of the sale of an invention or patent. The Fellow had agreed to accept shares in the venture for working the patent in part payment for the patent, and the Income Tax Authorities contended that the proceeds, including the value of the shares, should be reckoned as income.

The matter was eventually decided in favour of the Fellow on the lines of the opinion expressed in a book by the late Hallett Fry on Income Tax, based on the report of a Royal Commission (1905), namely, that "the amount which a patentee receives from the sale of his patent is capital and not income, though if he, instead of a lump sum, receive an annual payment as royalty, it would be taxable by deduction . . ." The Report of the Commission showed that "invention can hardly be regarded as a profession . . ." and that ". . . when it leads to patent rights, the sale of them is but little of the character of annual income. Where a royalty is paid, the income from it is assessed ; where the patent is purchased outright, the transaction is treated as a capital transaction on both sides, and no assessment is made on the original patentee in respect of the lump sum received by him."

Legal and Parliamentary Committee.—The Legal and Parliamentary Committee have had under preliminary consideration the desirability and possibility of taking steps to secure powers to restrict the practice of chemistry, in any event for the present, in matters affecting public health and in dangerous trades, to duly qualified and registered chemists.

The Committee have also discussed means whereby the Council may be kept informed of measures promoted in Parliament which may affect the interests of the profession of chemistry. Steps have been taken to secure the help of Members of Parliament, who will undertake to watch such interests in the House of Commons. The Council will be glad if Fellows and Associates will direct the attention of the Legal and Parliamentary Committee to any such matters which may come to their notice.

Services Committee.—The Services Committee was originally appointed, acting jointly with representatives of the Institute of Metals, to consider the position of chemists and metallurgists in the Naval, Military and Air Services, and the action to be taken to secure for them better recognition and status. In a Report, submitted to the Council in November last, the Committee arrived at the conclusion that, in view of the important work of chemists and metallurgists during the War and of the fact that much waste of men and material occurred through the absence of any permanent Service body capable of dealing with chemical and metallurgical questions, it was desirable that a Royal Army Chemical and Metallurgical Corps, or similar organisation, corresponding in some respects to the Royal Army Medical Corps, should be formed to deal with such questions. With the concurrence of the Councils of the two Institutes, a Sub-Committee was, therefore, appointed to consider and report on this proposal.

In April of this year the Council of the Institute of Metals decided not to proceed further with the matter, but the representatives of the Institute of Chemistry proceeded to discuss a report from the Sub-Committee, including a draft scheme for the establishment of an Army Chemical Service, which was in due course submitted to the Council. The Committee suggested that this scheme would form the basis for a working organisation, and would indicate what is desirable in the interests of the country. Moreover, it was suggested that the principles might be extended to apply to other scientific

professions, constituting an army scientific organisation, similar provision being made in respect of the Naval and Air Forces. The Committee held also that such a scheme would provide for the proper organisation of chemists in the event of war, having due regard to the question of securing their recognition and status.

Early in April a letter had been received from the Conjoint Board of Scientific Societies suggesting the desirability of making provision for continuous research in the applications of science to war, and of providing facilities for the mobilisation of a scientific staff without delay and in the most efficient manner. The Services Committee thereupon recommended that a copy of the scheme be forwarded to the Conjoint Board with a statement that the Institute would be prepared to support any representations on the lines suggested which might be made to the Government Departments concerned. The Report of the Committee was duly approved in principle by the Council and forwarded to the Conjoint Board, who will proceed to consider it at a meeting to be held during the present month.

In connection with the above, attention has been directed to the following paragraph quoted from the *Journal of Industrial and Engineering Chemistry*, Vol. XII., No. 4, 1920, published by the American Chemical Society:—

“The Army Reorganisation Bill passed the House of Representatives on March 18th, 1920. It contains a section providing for the Chemical Warfare Service as a separate unit of the Army, with a chief holding the rank of Brigadier-General, and with ninety officers, ranging from Colonel to Second-Lieutenant, and 1,500 enlisted men. It was in the House that friends of the Chemical Warfare Service had most to fear, for certain members had been outspoken in their opposition to the Service being made a separate unit. This opposition, however, gave way, and now the bill goes to the Senate, where it seems there is absolute unanimity of sentiment that the Chemical Warfare Service shall not only be a separate unit, but that full provision shall be made for its com-

plete development and thorough efficiency. It is a safe prediction that any changes made in the section pertaining to the Chemical Warfare Service from now on will be only such as tend to strengthen and improve the Service."

Research Chemicals.—Representations having been made to the Council that chemists engaged in organic research were severely handicapped by the lack of organic chemicals for research purposes, a Committee was appointed in March to consider steps to be taken to secure adequate supplies of such substances. The suggestion had previously been made by several well-known research chemists that the Government should allow free import of research chemicals from Germany. The supply available in this country was considered totally inadequate ; while German firms had listed over 3,000 organic chemicals, British firms had listed less than 400, even some fairly common substances being practically unobtainable, and while some compounds were prepared in a high degree of purity, others could only be obtained as technical products and had to be purified before use. As to the question of cost, the Committee were informed of instances where the prices, exclusive of the cost of the bottles, were 300 per cent. above the prices quoted in trade journals. As to the remedy, it was suggested that, in the absence of any statement of policy in the interests of those who were desirous of building up a research chemical industry in this country, German research chemicals should be introduced and any attempt to place restrictions on their importation should be opposed.

The Committee learned, however, that, if it were intended to develop the industry, research workers would give what aid they could to such an undertaking. Although the production might not at first be an attractive proposition to the manufacturers, the Committee were earnestly desirous that an attempt should be made to secure such production, and urged that chemists should do all that was possible to encourage it.

In any case, research workers required to know what chemicals were being made in this country and where they

could be obtained. It was desirable, therefore, that in the first place a list of chemicals available for purchase should be prepared, and that some organisation should be established for collecting and distributing them.

Certain chemical manufacturers were known to have the matter in hand, and were seeking information from research workers as to their requirements. The Committee learned, moreover, that the Association of British Chemical Manufacturers, who had also been in correspondence with the Chemical Society, was already moving in the matter.

In May, the Committee received from the Association three lists of research chemicals, including 234 substances listed by the Chemical Society, which members of the Association made and/or were prepared to supply, 29 which they did not ordinarily manufacture, but were prepared to make, and about 123 not on the Chemical Society's List, which members of the Association made and/or were prepared to supply. The Association pointed out that the lists included certain substances, of which the manufacturers might not be able to guarantee a permanent supply unless there were a sufficient demand, and that the lists should be regarded as merely preliminary, since it was hoped to supplement them from time to time.

The Council of the Institute, on the recommendation of the Committee, decided to offer facilities to students and research workers by acting as a "clearing house" for substances not easily obtainable from British manufacturers and dealers, it being understood that inquiries would be addressed, in the first instance, to the Association of British Chemical Manufacturers (166, Piccadilly, London, W.). The Council, therefore, invite research workers to mention substances of which they may be in special need for research purposes, on the understanding that, if any should not be obtainable through the Association, the Institute will be prepared to circularise such requirements to research workers, in order that chemists requiring such substances may be put into touch with those who have them to spare.

LIST I.

(Research Chemicals on Chemical Society's List which Manufacturers make and/or are prepared to supply.)

- | | |
|--|------------------------------|
| Acenaphthene. | Benzidine Hydrochloride. |
| Acetal. | Benzil. |
| Acetaldehyde, b.p. 21°. | Benzoic Acid. |
| Acetamide. | Benzoin. |
| Acetanilide. | Benzophenone. |
| Acetic Acid, 100%. | Benzoyl Chloride. |
| Acetic Anhydride, free from homo- | Benzyl Acetate. |
| logous anhydrides. | Benzyl Alcohol from Toluene. |
| Acetin (mono). | Benzyl Benzoate. |
| Acetone refined b.p. 56°—57°. | Benzyl Chloride. |
| Acetophenone. | Benzyl Cyanide. |
| Acetyl Chloride. | Benzyl-Aniline. |
| Acetyl-Phenetidine, <i>see</i> Phenace- | Borneol. |
| tine. | Bornyl Acetate. |
| Acetyl-Salicylic Acid. | Brom-Benzene. |
| Allyl Alcohol. | Brom-Camphor. |
| Allyl Iodide. | α -Brom-Naphthalene. |
| Allyl Isothiocyanate. | Brom-Phenol (para). |
| Aloin. | Bromoform. |
| Amido-Benzoic Acid (ortho). | Brucine. |
| Amido-Phenol (meta). | Butyl Alcohol (normal). |
| Amido-Phenol (para). | |
| Amyl Acetate for Photometry (Hef- | Caffeine. |
| ner lamps). | Camphor. |
| Amyl Alcohol (iso) Pyridine-free. | Camphoric Acid. |
| Amyl Formate (iso). | Camphoric Anhydride. |
| Amyl Nitrate (iso). | Carbamide, <i>see</i> Urea. |
| Anethol. | Carbon Disulphide. |
| Aniline. | Carbon Tetrachloride. |
| Aniline, refined. | Carvacrol. |
| Aniline Hydrochloride. | Carvol (Carvon). |
| Aniline Oxalate. | Chloral Alcoholate. |
| Anisaldehyde. | Chloral Hydrate. |
| Anisidine (ortho). | Chloroform. |
| Anisol. | Cinchonidine. |
| Anthranilic Acid, <i>see</i> Amido-Benzoic | Cinchonine cryst. |
| Acid (ortho). | Cinnamic Acid. |
| Antipyrine, <i>see</i> 1-Phenyl-2, 3-Di- | Cinnamic Aldehyde. |
| Methylpyrazolon. | Citral. |
| Atropine Cryst. | Citric Acid. |
| | Citronellal refined. |
| Benzaldehyde. | Citronellol. |
| Benzamide. | Cocaine. |
| Benzanilide. | Codeine and Salts. |
| Benzene, "for analysis" and for | Coumarin. |
| determination of molecular | Cresol (ortho). |
| weights. | Cresol (meta). |
| Benzidine refined. | Cresol (para). |

Cresotinic Acid (ortho).

Dextrin.

Dextrose.

Diacetyl Dioxime (Dimethyl Glyoxime).

Dianisidine, refined.

Dibrom-Benzene (para).

Dimethyl Aniline.

Dinitro-Benzene (meta).

Dimethyl-Sulphate, *see* Methyl Sulphate.

Dinitro-Phenol (OH NO_2 ; $\text{NO}_2 = 1 : 2 : 4$).

Diphenylamine cryst.

Diphenyl-methane.

Diphenyl-thiourea (sym).

Ethyl Acetate.

Ethyl Aceto-Acetate.

Ethyl Alcohol, 99, 8%.

Ethyl Aniline (mono).

Ethyl Benzoate.

Ethyl Bromide.

Ethyl Carbonate.

Ethyl Chlor-Acetate.

Ethyl Chlor-Carbonate.

Ethyl Chloride.

Ethyl Cinnamate.

Ethyl Cyan-Acetate.

Ethyl Ether.

Ethyl Ether for anæsthesia.

Ethyl Ethyl Aceto-Acetate.

Ethyl Formate.

Ethyl Iodide.

Ethyl Malonate.

Ethyl Nitrate (Alcoholic solution, 15%).

Ethyl Oxalate.

Ethyl Salicylate.

Ethylene Bromide.

Eucalyptol.

Eugenol.

Fluorescein.

Formaldehyde Solution.

Formamide.

Formanilide.

Formic Acid.

Gallic Acid.

Geraniol.

Glycerol.

Glycero-Phosphoric Acid Solution, 25%.

Glycocoll.

Grape Sugar, *see* Dextrose.

Guaiacol Cryst.

Hexa-Methylene-Tetramine.

Hippuric Acid.

Hydrazine Hydrate.

Hydrazine Hydrochloride.

Hydrobromic Acid, 1.49 free from chlorine.

Hydrobromic Acid in Acetic Acid.

Hydriodic Acid, 1.7 (Zeisel).

Hydroquinone.

Hydroxylamine Hydrochloride.

Iodine resubl.

Iodobenzene.

Iodoform Cryst.

Isobutyl Alcohol.

Isosafrol.

Lactic Acid, 1.21.

Lactose.

Ligroin 0.71—0.72.

Linalool.

Malic Acid.

Malonic Acid.

Maltose.

Mannitol.

Menthol.

Mesityl-Oxide.

Methyl Acetate.

Methyl Alcohol.

Methyl Benzoate.

Methyl Iodide.

Methyl Oxalate.

Methyl Salicylate.

Methyl Sulphate.

Methylamine, 33% solution.

Methyl-Ethyl Ketone.

Milk Sugar, *see* Lactose.

Naphthalene.

β -Naphthol.

Nitraniline (ortho).

Nitraniline (meta).

Nitraniline (para).

Nitro-Phenol (ortho).

Nitro-Phenol (para).

- | | |
|---------------------------------|--------------------------------|
| Oenanthol. | Quinoline. |
| Oleic Acid. | Quinone. |
| Oxalic Acid. | Resorcinol. |
| Oxamethane. | Saccharose. |
| Oxamide. | Safrol. |
| Oxanilide. | Salicin. |
| Paraldehyde. | Salicylic Acid Cryst. |
| Petroleum Ether, 0.64—0.66. | Sodamide. |
| Phenacetine. | Starch, fat-free. |
| Phenetidine (para), refined. | Strychnine Cryst. |
| Phenetol. | Succinic Acid. |
| Phenolphthalein. | Sulphanilic Acid. |
| Phenyl Acetate. | Sulphonal. |
| Phenyl Salicylate (Salol). | Sulphuryl Chloride, refined. |
| Phenyl Acetic Acid. | Tartaric Acid cryst. |
| Phenyl Hydrazine. | Terpine Hydrate. |
| Phenyl Hydrazine Hydrochloride. | Thio-Carbamide (Thiourea). |
| Phosgene in sealed tubes. | Thionyl Chloride. |
| Phosphorus Oxychloride. | Thymol. |
| Phosphorus Pentachloride. | Toluene. |
| Phosphorus Trichloride. | Toluene Sulphochloride (para). |
| Phthalimide. | Trichlor-Acetic Acid. |
| Phthalic Acid. | Trioxymethylene. |
| Phthalic Anhydride. | Urea. |
| Picric Acid. | Uric Acid. |
| Piperonal. | Vanillin. |
| Pyridine. | Xylene. |
| Pyrocatechol. | |
| Pyrogallol resubl. | |
| Quinine. | |

LIST 2.

(Research Chemicals on Chemical Society's List which members of the Association do not manufacture, but which they are prepared to make.)

- | | |
|----------------------|---|
| α -Alanine. | Cresotinic Acid (meta), refined |
| Amygdalin. | $\text{CH}_3 : \text{OH} : \text{COOH} : = 1 : 3 : 4$. |
| Anisidine (para). | Cresotinic Acid (para), refined |
| Anthracene, refined. | $(\text{CH}_3 : \text{OH} : \text{COOH} : - 1 : 4 : 3)$. |
| Arabinose. | Cymene. |
| Azoxybenzene. | Dulcite. |
| Azobenzene, refined. | Fenchone. |
| Benzonitrile. | Guanidine Carbonate. |
| Camphor-oxime. | |
| Conine. | |

Inulin.
Isobutyric Acid.

Mandelic Acid.
Mannose.
Methyl Bromide in sealed Tubes.
Nitro-Benzoyl Chloride (meta).

Phenetidine (ortho), refined.

Phenol, synthetic.
Piperidine.

Ricinollic Acid.

Salicylamide.

Terpineol Cryst.
Toluene Sulphonic Acid (para).

LIST 3.

(Research Chemicals not on Chemical Society's List which members of the Association make and/or are prepared to supply.)

Abrastol.
Acetone Sulphite.
Aconitine.
Aconitine Hydrobromide.
Allantoin.
Amido-acetic Acid.
Amido-phenol Hydrochloride (para).
o-Amido Pyridine.
Amyl Alcohol.
Amyl Benzoate.
Amyl Butyrate.
Amyl Nitrate.
Amyl Salicylate.
Amyl Valerate.
Apomorphine Hydrochloride.

Benzal Chloride (tech).
Benzamide Hydrochloride.
Benzene-Sulphonic Acid (75% solution).
Benzonaphthol.
Benzyl Ether.
n-Butyl Acetate.
Butyl Formate.
Butyl Nitrite.
n-Butyric Acid.

Cacodylic Acid.
Cantharidin B.P.
Carminic Acid.
Caryophyllene.
Cerotic Acid
Chlorbutol (trichlor tertiary butyl alcohol).
Chlorophyll.
Chlor-phenol (ortho).

Chlor-Phenol (para).
Cetarrine Hydrochloride.
Cresyl Acetate (ortho).
Cresyl Acetate (meta).
Cresyl Acetate (para).
Cresyl Acetate (para).
Cresyl Methyl Ether (ortho).
Cresyl Methyl Ether (meta).
Cresyl Methyl Ether (para).
Cyanacetamide.

Diastase.
Dichloroacetic Acid.
Diethylaniline.
Diethyl Acetic Acid.
Diethyl Barbituric Acid.
Diethyl Ethyl Malonate.
Dimethyl-amido-azobenzene.
Dimethyl-Amido-Benzaldehyde (para).
Dinitro Cresol (ortho).
Emetine.
Emetine Hydrobromide.
Emetine Hydrochloride.
Emodin.
Eosin.
Erythrosin.
Eserine.
Ethyl Butyrate.

Fuchsin.
Fumaric Acid.

Gelsemine Hydrochloride.
Geranyl Acetate.
Geranyl Butyrate.

Geranyl Formate.
Glyceryl Triacetate.

Homatropine.
Homatropine Hydrobromide.
Hydrastine.
Hydrastine Hydrochloride.
Hydrastinine Hydrochloride.
Hydrazine Sulphate.
Hyoscine Hydrobromide.
Hyoscyamine.
Hyoscyamine Sulphate.

Isobutyl Acetate.
Iso-Eugenol.
Iso-Eugenol Acetate.
Isopilocarpine.

Linalol.
Linalyl Acetate.

Meconic Acid.
Methoxy Cumaric Aldehyde.
Menthyl Acetate.
Menthyl Valerate.
Methyl Carvacrol.
Methyl Eugenol.
Methyl Iso-Eugenol.
Myristic Acid.

Nitroparacresol.
Nitroso-antipyrine.
Nitroso-beta-naphthol.
Nitrotoluene (para).

Phellandrene.
Phenyl Carbonate.
Phenyl Ethyl Acetate.
Phenyl Ethyl Alcohol.
Physostigmine and Salts.
Pilocarpine Hydrochloride.
Pilocarpine Nitrate.
Piperine.
Propyl Acetate.

Raffinose (crude).
Rhodinol.
Rosaniline.
Rosaniline Acetate.

Sebacic Acid.
Sparteine.
Sparteine Sulphate.
Sulphindigotic Acid (solution).

Thiosinamine.
Triacetin.
Trichlor-meta-cresol.
Tri-cresyl Carbonate (ortho).
Tri-cresyl Carbonate (meta).
Tri-cresyl Carbonate (para).
Tri-cresyl Phosphate (ortho).
Tri-cresyl Phosphate (meta).
Tri-cresyl Phosphate (para).
Tri-phenyl Phosphate.
Tri-nitro Meta Cresol.
Tri-nitro Tertiary Butyl Xylene.

Xylidyl-Succinamic Acid.
Xylidyl-Succinamide.

Analytical Standards.—The Council of the Society of Public Analysts have transmitted to the Council of the Institute a Report, abstracted below, of a Committee consisting of Messrs. L. Archbutt, W. J. A. Butterfield, G. Nevill Huntly, and G. Rudd Thompson, appointed to consider the desirability of making provision for supplies of standard chemical substances.

The Committee is satisfied that there is a demand for Analytical Control Standards, which is now being chiefly met by private enterprise and by the importation of the U.S.A. Bureau of Standards Samples, and that the demand appears reasonable for checking and educational rather than commercial purposes. The Committee think that every effort should be made to secure control of the supply of such standards by a responsible body representative primarily of analytical chemists, which might with

advantage seek the co-operation of the manufacturing interests, the Engineering Standards Association, the U.S.A. Bureau of Standards, as well as perhaps the existing private organisation.

The Committee recommend that the Society of Public Analysts should take the initiative in forming a representative Analytical Standards Committee, the objects of which shall be :—

- (1) To decide for which chemicals, commercial metals and alloys, and perhaps ores and certain other products, it is desirable to supply standard samples.
- (2) To settle how samples shall be provided and issued.
- (3) To take steps for securing comparative analyses of the proposed standard samples by groups of chemists engaged in the analysis of the particular class of materials to which the sample belongs.

The Analytical Standards Committee should consist of five to seven members of the Society of Public Analysts, actively engaged in analyses of pure chemicals, alloys, metals, etc.; and as the Society numbers among its members representatives of other bodies, such as the Institute of Chemistry, the Association of British Chemical Manufacturers, the Society of Chemical Industry, the Iron and Steel Institute, the Institute of Metals, etc., the Committee suggest that it would be easy to select members for the Standards Committee, who, subject to the approval of the above bodies, would act as their representatives.

The Analytical Standards Committee should at the outset arrange :—

- (1) For the provision of certain chemicals, such as benzoic acid, sodium oxalate and sugar.
- (2) To report, after making full inquiries of manufacturers, users and teachers, whether there is any legitimate scope for the extension of the scheme on the lines of the U.S.A. Bureau of Standards.

Further, the Standards Committee should ascertain to what extent and by what procedure the Department of Scientific and Industrial Research would support the Committee by a grant until the Committee's work becomes self-supporting.

The Council of the Institute have concurred with the proposals contained in the Report, and have nominated Mr. F. H. Carr, Dr. J. T. Dunn, Mr. Lewis Eynon, and Mr. F. W. Harbord, any of whom would be willing to act as representatives of the Institute in this connection.

Regulations.—In October next a considerable number of Associates elected in 1917 will have completed the three years' registration necessary before proceeding to the Fellowship. The conditions under which such Associates can attain to the Fellowship were given in Part II. of the Journal, and have been printed in a separate pamphlet, which can be obtained from the Registrar.

The Council have recently received from several Associates the request that they should be allowed to take the Examination for the Fellowship before the expiry of the necessary three years registration, and they have decided to consider on their merits applications for such examination and to allow Associates to take the examination provided the evi-

dence of their experience is satisfactory, it being clearly understood that no Associate can be elected to the Fellowship until he has been, since his admission to the Associateship and for a period of three years therefrom, continuously engaged in the study and practice of chemistry. The three years' registration obligatory under the provisions of the Charter is duly recorded in the Regulations published in February, but was inadvertently omitted from the abstract of the revised Regulations given in Part II. of the Journal published in April.

Under the Regulations for the admission of Associates, a candidate who holds the Associateship in Chemistry of the Royal Technical College, Glasgow, A.R.T.C., taken after a four years' day course, including chemistry, physics, mathematics, and an optional subject, will be entitled to apply for admission to the Associateship of the Institute without further examination, provided he produces evidence of having passed an approved preliminary examination in accordance with the Regulations.

Assistants, Chemists, Admiralty Inspection Laboratories.—The Council have been in communication with the Admiralty with reference to the official advertisement which appeared recently in the public press for Assistant Chemists required at the Admiralty Inspection Laboratories, Holton Heath. The terms of the advertisement were calculated to convey the impression that the value of the services of Associates of the Institute with technical experience was assessed at less than they can now easily command. The Admiralty was addressed on the matter, and the salary, which had been fixed at £270—£350, was subsequently altered to £320—£412. The Registrar learned, in conference with the authorities, that the original salary had been fixed in accordance with the provisions made in the estimates and that delay had arisen pending the consent of the Treasury to the alteration. He was reassured that the Admiralty recognised fully the importance of securing competent chemists and of attaching such conditions to their appointments as will attract and retain them for the public service, although the pressure at present brought to bear on Government Departments generally to economise appears to render it difficult for them to effect immediately the whole of the organisation for chemical work which is considered desirable.

Students available for Vacation Employment.—The Registrar has received the names of several students in London and elsewhere who are seeking opportunities for gaining practical experience during the vacation (July to October), and will be glad to hear from Members who can utilise their services.

Increase of Students in Chemistry.—Returns received by the Institute from forty Universities and Colleges show that 4,808 students are preparing for degrees and diplomas in Chemistry, compared with 2,078 in 1913-14—an increase of 130 per cent.

Address to Students, Royal Technical College.—On the invitation of the Professors of Chemistry at the Royal Technical College, Glasgow, the Registrar of the Institute, with the consent of the Council, visited the college on May 12th and addressed the students in the Chemical Department, numbering nearly 200, on "The Profession of Chemistry." Prof. Forsyth J. Wilson introduced the lecturer, who dealt with the general education of professional men, the word "chemist," technical training, professional organisation, professional conduct, and the prospects of the profession. The students subsequently asked questions and a number of them subsequently interviewed the Registrar individually.

At the conclusion a vote of thanks was passed to the Registrar on the motion of Prof. I. M. Heilbron.

Exhibition of Apparatus, Materials, &c.—By arrangement with the London Section of the Society of Chemical Industry (Chairman, Mr. Julian Baker, Fellows and Associates of the Institute were invited to an Exhibition of Apparatus and Materials, etc., arranged by the London Section of the Society, held at the Institute on June 7th. A large number of Members of both bodies visited the Institute. The exhibitors included the following:—Aluminium Plant and Vessel Co., A. Boake, Roberts & Co., The British Drug Houses, W. J. Bush & Co., The Cambridge Scientific Instrument Co., Cannon Iron Foundries, T. & C. Clarke, Adam Hilger, Dr. C. A. Keane, Kestner Evaporator and Engineering Co., Arthur Johnson & Co., Dr. R. Lessing, Mr. C. A. Mitchell, Pharmaco Chemical Products Co., The Sheringham Daylight, S. H. M. Co., Thermal Syndicate, and Alexander Wright & Co.

Examinations.—The Council have received reports of the Examinations held in April (see pages 190 *et seq.*).

Local Sections.

Conference of Hon. Secretaries of Local Sections.

—A Conference of Hon. Secretaries and representatives of Local Sections was held at the Institute on Friday, April 16th. The following representatives attended :—

Birmingham and Midland ..	F. C. A. H. Lantsberry.
Edinburgh and East of Scotland	B. D. W. Luff.
Glasgow and West of Scotland	T. A. Wilson.
Gretna and District	H. R. Neech.
Ireland	Dr. A. G. G. Leonard.
Liverpool and N.W. Counties	John Hanley.
London and S.E. Counties ..	P. H. Kirkaldy.
Manchester and District ..	F. W. Atack.
Newcastle-on-Tyne and N.E. Coast	J. H. Paterson.
South Wales	A. J. Shelton.
Leeds Interviewing Committee	William Lowson.

The Conference discussed the allocation of Fellows and Associates to districts for voting purposes, under the proposed new By-laws, and the topographical distribution was mutually agreed upon.

The following figures represent roughly the distribution of members in the respective voting districts :—

Birmingham and Midland Counties, including Nottingham	277
Bristol and S.W. Counties	102
Liverpool and N.W. Coast	160
London and S.E. Counties, including East Anglia	1,095

Manchester and District	..	..	..	247
N.E. Coast and Yorkshire	..	..	..	292
Edinburgh and East of Scotland	..	..	..	106
Glasgow and West of Scotland	..	..	..	162
Wales, with Monmouthshire	..	..	..	90
Ireland	..	..	..	72
				<hr/>
				2,583
				<hr/>

NOTE.—Over 400 members of the Institute are at present abroad.

In all cases, except in the districts of Liverpool and Manchester, the dividing lines have been determined by counties; in the cases of Liverpool and Manchester, an agreement has been arrived at by drawing a line through the postal districts of Warrington and Wigan, all places within the postal districts of these two towns being allocated to Liverpool; all towns east of that line being allocated to Manchester. Any question arising as to the allocation of a town on the line referred to will be decided according to whether the larger proportion of its postal district lies to the west, Liverpool, or to the east, Manchester, side of the line.

The Conference met the Finance Committee, when the question of providing funds for Local Sections was discussed, and it was agreed to cover the expenses of four official meetings, it being also agreed that accounts for the same should be rendered annually in December. It was ascertained that, whereas some Sections call upon their members to pay a subscription additional to their subscription to the Institute, in other Sections the Committee regard all the members residing within the corresponding district as members of those Sections without requiring payment of any additional subscription.

The question was discussed also as to whether the Secretaries of Local Sections should circularise notices of their meetings to all members within their respective districts, and it was agreed that, provided every member was given the

opportunity of joining a Section, the Secretaries should not be called upon to notify those who did not become members.

The Conference also met the Nominations, Examinations, and Institutions Committee, and were in attendance throughout their proceedings, while several candidates for membership were interviewed and applications were considered.

At the conclusion of business, the Treasurer thanked the Hon. Secretaries of Local Sections in the name of the Council for their attendance, expressing the hope that such meetings would lead to a better realisation of the work of the Institute by the members of Sections, and tend to maintain the good understanding existing between Local Sections and the Council.

Several of the Hon. Secretaries, in response, stated that they had derived great benefit from attending the meetings and observing the procedure of the Committees.

Edinburgh and East of Scotland Section. — A Joint Meeting of this Section with the Local Section of the Society of Chemical Industry was held in Edinburgh on May 11th, Dr. Drinkwater presiding.

The Chairman opened a discussion on the training of chemists for industrial careers with special reference to the desirability of including instruction in Applied Chemistry in the College curriculum.

In the course of an interesting debate, both the teachers' and the technologists' opinions were voiced by numerous representatives. The general feeling was that early specialisation should be discountenanced and that any instruction in Applied Chemistry should be of a general nature and restricted to descriptions of the more common chemical operations and of the materials used in plant construction. Further, it was held that such instruction should be supplemental to and not in any way to supplant a thorough training in pure chemistry, mathematics and physics.

The following members contributed to the discussion: Prof. Boon, Drs. Cumming, Lauder, Ranken, and Messrs.

Aitken, W. A. Williams, S. Stewart, Williamson, W. G. Martin, J. Rutherford Hill, D. B. Dott, Luff, Bruce and Forsyth.

Irish Section.—A meeting of the Section was held on Wednesday, April 21st, in the Royal College of Science. Prof. W. E. Adeney, in the chair, when Mr. J. W. Parkes delivered an address on the Manufacture of Cordite.

The Lecturer introduced the subject by a brief reference to the history of explosives generally, including gunpowder, gun-cotton, nitroglycerine and ballistite. He discussed the reasons for the changes made in the composition of cordite: first, after the South African War, to reduce gun erosion and second, during the late war, to eliminate the use of acetone, of which only small supplies were available.

The Lecturer dealt with the manufacture of oleum, nitric acid, gun-cotton and nitroglycerine at Messrs. Kynochs, the various processes being illustrated by slides. The stages in the preparation of cordite were described and reference was made to the Mannheim Oleum Plant, the Valentiner nitric acid system, the purification of cotton, the pressing of cordite, the winding of the cordite on bobbins, the blending of cordite and the filling of cartridges.

Specimens of cordite of various sizes and cartridges in different stages of manufacture were exhibited.

Dr. J. Reilly, in proposing a vote of thanks to the Lecturer, said that the work of Roger Bacon on the preparation of gunpowder was not empirical but definitely scientific. Although Schönbein and Abel were outstanding names in the history of cellulose nitrate there was another name that deserved mention: V. Lenk, who introduced the alkali-boil purification process. Reference was made to the work of Robertson on the boiling of cellulose nitrate and the stabilising results due to the initial acid-boil removing sulpho-esters. The physical aspect of the "Thomson Displacement Process" was also briefly considered. Dr. Reilly mentioned certain problems of special interest to the research chemist: The

comparison of cotton-waste and sliver, the treatment of cotton, the formation of oxycellulose, the drying of gun-cotton and cordite, and the problem of stability and stabilisers.

Mr. O'Farrelly, in seconding the vote of thanks, alluded especially to two problems which arise in the manufacture of cordite, namely, the question of stability and the drying of cordite.

Dr. Leonard referred to the testing of stability in the manufactured cordite and to the influence of various stabilisers. He also raised the question of the significance of traces of mercuric chloride in the finished cordite.

Mr. Parkes having replied to various questions raised in the discussion of the paper, the meeting terminated.

Liverpool Section.—In a paper read before the Liverpool Section on May 13th, Mr. H. J. Evans advocated the formation of an Association among Members of the Institute for the purpose of closing the profession. He said that it was the chief desire of the majority of the Members to have the profession of Chemistry put on a satisfactory footing. It was also desirable to have the functions and scope of the technical chemist legally defined. Referring to the exclusiveness and privileges of the professions of Law and Medicine, he showed how the public interest was safeguarded by the continuance of these privileges, quoting, in the first instance, Stephen's Commentaries:—"In most employments, the rewards resulting from success and the discredit and failure consequent upon incompetency form such a natural and sufficient safeguard to the public that they will not be undertaken without the necessary qualifications. But there are professions productive of evil so serious when improperly exercised and so liable at the same time to be exercised by unfit persons, as to make it proper to subject them to the restraints of legal regulation. Those callings which the law deems to be of that nature (or those, at least, which have attracted the notice of our legislature as such) are the professions of law and medicine."

A person whose *name* does not appear on the Register of the General Medical Council may not claim the title of legally qualified medical practitioner, nor recover any charge in any Court of Law for medical advice or attendance, or medicine prescribed or supplied, nor may he hold any Government or any other medical appointment nor sign any certificate required by the Medical Act to be signed by a medical practitioner. Any person infringing these regulations is liable to heavy penalty, and the Council also possess power to remove the names of persons from the Register for improper conduct, and may, in conjunction with the Privy Council, deprive any examining body of the power of granting qualifications.

The General Medical Council consists of representatives of certain colleges and universities, including the Royal Colleges of Physicians and Surgeons of the United Kingdom and the Apothecaries' Society of London, together with five persons nominated by the Crown, and five by the general body of medical practitioners.

Mr. Evans also mentioned that since about 1886, medical practitioners were forbidden to employ unqualified assistants.

With regard to the legal profession, the Law Society was incorporated by Royal Charter in 1831, and restriction of practice was provided by the Solicitors Acts of 1843 and 1860. By the Act of 1843 a prospective solicitor, having passed a preliminary examination, must be duly articled to a practising solicitor for a term of five years and pass two examinations. Being articled entails the payment of £80 Stamp Duty, and payment of such other fee or premium as may be agreed upon between the parties. A solicitor's clerk, if given his articles, has to serve the full term of five years, unless he has been engaged in such work for ten years, in which case he is remitted two years, serving three in all. No solicitor may have more than two articled clerks at one and the same time, nor may a solicitor, who is himself employed as a clerk, have an articled clerk.

The underlying principle of restricting these professions

is protection by the State of human life and health and property. The question arose, then, can we demonstrate that it would be to the public interest that the profession of chemistry should be similarly regulated? Gigantic transactions depend on the "yea" or "nay" of the consulting chemist. Heavy losses would be suffered by firms or individuals if the chemist were not competent to carry out the work he undertakes, or if he or his assistant made mistakes. The public should not be liable to such risks: the consulting chemist should be duly licensed by a central body and should not be allowed to issue a certificate or claim a fee unless so licensed. A man on trial for his life on a murder charge may be acquitted or doomed on the word of the chemist. Risk of incompetence in such a case alone calls for drastic legislation. The importance of restriction in the case of the work of the public analyst has been acknowledged; no person other than a medical practitioner duly qualified in chemistry or a Fellow or Associate of the Institute, who has qualified in the examination in the chemistry of food and drugs, conducted on lines approved by the Ministry of Health, is held to be qualified for appointment as an analyst under the Sale of Food and Drugs Acts. In the case of the works chemist, the safety and lives of work-people, and the property of shareholders, are dependent upon his skill and competence: he should be a person of proved and undoubted ability.

Mr. Evans then referred to the forces to be combated to attain the object in view:—

- (1) Opposition from unqualified persons.
- (2) Opposition from firms employing unqualified persons.
- (3) Internal opposition: the opposition of inertia or lack of interest on the part of the general body of those who are qualified.

In many cases unqualified men come from the laboratories of qualified chemists, where they started as laboratory boys, were gradually put on to routine testing, and after a few years regarded themselves as chemists. If they had passed

approved preliminary examinations, had served as articled pupils, and had undertaken systematic training in an approved institution, as required by the Regulations, that would be a different matter.

The doctors dealt with the difficulties summarily, and the lawyers safeguarded themselves against it rigidly, but it was a difficult matter to persuade chemists to agree never to employ unqualified persons except as laboratory assistants. The question might be raised, "What about the sons of poor parents? Are they to be excluded from the profession?" On the other hand, two further questions might be asked:— (1) "Are we a philanthropic society, whose object is to provide employment for the children of the deserving poor, or are we a professional body of men who are striving to defend ourselves, and particularly our younger members, from unfair competition?" (2) "Do the medical and legal professions make any provision for the sons of poor parents?"

The son of the poorest parents, if he possesses sufficient ability, can proceed from the elementary to the secondary school and thence to the university, and so enter the profession in the regular manner. Some chemists say that men without systematic training are better for their purpose than those trained in the universities. The latter, on going to a laboratory or works for the first time, need to get used to new conditions, but when once they have done so, they apply the store of knowledge which they have accumulated and prove their worth well in the end. The laboratory boy, when he has grown too big and too old to be a laboratory boy, should be sent to a trade: it would be better for him in the end.

Mr. Evans illustrated these arguments from his experience. The Institute was analogous in some respects to the General Medical Council in matters of professional conduct, but if it removed the names of men from the Register they could still continue practising and collecting fees, while if a doctor or lawyer was guilty of unprofessional conduct his name was removed from the Register and he could neither practise nor collect fees.

Coming to the proposed formation of an Association for the purpose of closing the profession, he suggested that membership of this Association should be compulsory on every member joining the Institute, and that the machinery of the Local Sections should be brought to bear on the matter. The Association should have a paid Secretary, of persistent and forceful character and great tenacity of purpose, preferably a chemist, but certainly a barrister, to find ways and means of bringing the matter before the public and in the right quarters. It would mean hard work and self-sacrifice; the senior members would have to hold out the helping hand to the younger ones more than they had done in the past, and the younger ones would have to use all their weight as well. It was worth every effort and every sacrifice so that a safe and honoured heritage might be handed down to those who came after.

Copies of the paper have been sent to other Local Sections for discussion.

At the June Meeting of the Liverpool Section, a paper was read by Dr. George Tate on "The chemical characteristics of some of the *Torulæ*."

The Liverpool Section have addressed the Council on the question of giving further publicity to the recommendations noted in the Journal regarding fees charged by consulting chemists in private practice. The Institute will be prepared to supply members engaged in private practice with copies of slips which can be issued to their clients.

The Liverpool Section have also raised the question of closing the profession, which is referred to in the above paper and under "Legal and Parliamentary" on page 160, and have urged the Council to consider questions affecting the training of chemical assistants (see also p. 151).

London & South-Eastern Counties.—The first annual dinner of the London and South-Eastern Counties Section was held at the Holborn Restaurant, on May 18th, 1920. Mr. Patrick H. Kirkaldy, Chairman of the Section, presided.

The loyal toasts and that of the Institute having been honoured, the Registrar proposed "The London Section," to which the Chairman replied. A programme of music was provided by members, including Messrs. Harmsworth, Marlow, and Powell.

Manchester and District.—The Manchester Section have addressed the Council on the desirability of formulating a general basis for agreements of chemists occupying whole-time appointments. The matter has been referred to the Legal and Parliamentary Committee.

About 35 members of the Section attended an Ordinary General Meeting on April 21st for the purpose of discussing how the Institute might further protect the professional and economic interests of chemists.

Dr. Rée, in opening the discussion, referred to the present unsatisfactory position of the chemist from the economic standpoint, and expressed the opinion that the Council was perhaps not the most suitable body to deal with the matter. He suggested that a separate Committee should be appointed to deal specifically with economic problems, the members being chosen as far as possible on grounds of business ability. Mr. J. H. Lester drew attention to the recently-appointed Legal and Parliamentary Committee, and suggested that, if the members did not regard the Council as a suitable body for dealing with economic questions, they should correct the matter by electing different members of Council. Mr. J. R. Hannay expressed his views on the system of electing Council at present in vogue, and Dr. R. B. Forster stated his opinion that the Institute, as such, could not deal with economic problems, but suggested that members of the Institute might act together as an outside body, preferably in co-operation with an already existing association.

Newcastle-on-Tyne and North-East Section.—The Section held a dinner at the Station Hotel on Wednesday, April 28th, Mr. C. H. Ridsdale presiding. About twenty-five members were present, including the Registrar of the Institute.

After the loyal toasts the Registrar was called upon to make a statement of the advantages to be gained by the formation of Sections. He replied that Local Sections were mainly for social intercourse and especially in the interest of the junior members, whom he felt sure the senior members were at all times anxious to help. They had also proved of much value in forwarding suggestions to the Council. He referred to the Conference of Secretaries of Sections and the usefulness of such meetings as the connecting links between headquarters and members in various parts of the country.

A discussion was opened by Mr. J. Gard on the subject : " Is organisation on Trade Union lines advantageous to the Chemical Profession ? " Mr. Gard, local Chairman of the National Association of Industrial Chemists, referred to the conditions of whole-time appointments held by chemists in industry, and reviewed the objects and proceedings of trades unions generally. He held that the ideals of trades unionism, if not the practice, were advantageous to the professional as well as to the manual worker, in that they tended to increase both moral and financial status.

Mr. T. Wallace opposed the proposition, and spoke in favour of further organisation and of the provision of legislation to provide compulsory registration. He dwelt upon the importance of individual effort, and expressed his opinion that the average salaries published in the Journal of the Institute did not disclose the deplorable conditions to which Mr. Gard had referred.

The Registrar laid stress on the attitude which the Institute had always taken up in that they were working for posterity and hoped by the education of the present generation to prepare the way for the better treatment of the next. He thought they would incur grave responsibility if, after forty years of work developing the professional status of the chemist, they left the coming generation a legacy of trades unionism.

Brief comments were also made by Dr. Dunn, Prof. Bedson, Dr. Stich, Dr. Fleck, Mr. H. J. Young and the Chairman.

The general feeling of those present appeared to be that

success in the chemical profession depended to such an extent on individual ability and initiative that it would be impossible to adopt the principles of controlled output and collective bargaining, imposed by modern trades unionism.

The proceedings concluded with votes of thanks to the Chairman and to the Hon. Secretary, and also to the Registrar for his attendance.

South Wales Section.—A successful meeting of the Section was held at Swansea on June 5th, when the paper from the Liverpool Section (see above), on "The Closing of the Profession of Chemistry," was read and discussed.

The general opinion of the South Wales Section was that restriction of chemical practice would be advantageous, and that it should follow the lines of the legal profession rather than those of the medical profession.

The difficulties to be confronted were stated as follows : To define a chemist ; to determine, especially in industry, what chemical operations should be controlled by a chemist ; to compel industrial firms to employ only qualified chemists in control of such operations ; and to decide the question of employing chemical assistants who are unable to qualify but are yet capable and useful for many operations. The distinction should, in any case, be made that none but qualified and registered practitioners should be capable of issuing certificates.

Personal.—Prof. A. W. Crossley, consequent on his appointment as Director of the British Cotton Industry Research Association, has resigned from the Board of Examiners of the Institute. The Council have accorded their thanks to Prof. Crossley for his valuable services, and Prof. Samuel Smiles has been appointed Examiner in General Chemistry in his stead.

Mr. B. C. Aston has been asked to accept appointment as an Honorary Corresponding Secretary to the Institute at Wellington, N.Z., and Prof. D. Orme Masson and

Mr. George Tattersall have been asked to accept appointments as Honorary Corresponding Secretaries for Western Australia.

Prof. I. M. Heilbron has been appointed to the Chair of Organic Chemistry in the University of Liverpool.

Dr. T. Slater Price has been appointed Director of the British Photographic Research Association.

Mr. Charles Proctor has been appointed Companion of the Imperial Service Order.

Mr. B. J. Eaton and Major W. C. Ball (Fellows) have been appointed Officers of the Order of the British Empire (Military Division).

Mr. S. Baldwin (Associate) has been appointed a Member of the Order of the British Empire for services in connection with the War.

H.M. The King of the Belgians has appointed Prof. Wyndham R. Dunstan, C.M.G., a Commander of the Order of Leopold II.

H.M. The King of Italy has appointed Prof. Percy F. Frankland and Dr. T. M. Lowry Officers of the Order of St. Maurice and St. Lazarus.

The degree of D.Sc. (Liverpool), *Honoris Causa*, has been conferred on Prof. F. G. Donnan.

Indian Chemical Service.

Prof. Jocelyn Thorpe, President of the Chemical Services Committee appointed by the Government of India, has presented the Institute with a copy of the Report of the Committee, dated from Simla, February 28th, 1920.

The terms of reference to the Committee were :—

(1) To consider whether an all-India Chemical Service is the best and most suitable method of overcoming the difficulties and deficiencies pointed out by the Indian Industrial Commission.

(2) In the event of the Committee approving the principle of an all-India Service, to devise terms of recruitment, employment and organisation ; to indicate the extent to which chemists already in Government employ should be included in that service ; and to suggest what should be the relations of the proposed organisation with the public and with departments of the Government of India and of local governments.

(3) In particular, to frame proposals for the location, scope and organisation of institutions for chemical research.

The Committee consisted of Prof. Jocelyn Thorpe, President, Dr. K. S. Caldwell, Mr. R. W. Davies, Dr. W. Harrison, Sir P. C. Ray, Dr. J. J. Sudborough, and Dr. J. L. Simonsen (Secretary).

The publication includes an introductory note by the President of the Committee, dealing generally with the desirability of organising an efficient Government Chemical Service in the interests of the development of the chemical industries of India, in the course of which the importance of the thorough training of chemists, both for industrial and academic work, is emphasised. Prof. Thorpe advocates a course corresponding to that given in an Honours School at a British University, followed by one or two years' training in the methods of research, with instruction in the principles of engineering and machine drawing, where such training has not formed part of the Honours course. He suggests that, in order to instruct students in the use of large-scale appliances, laboratories containing types of plant used in chemical manufacture, of about

one-sixtieth the size of large scale plant, should be attached to Universities.

The Committee express the opinion that the Chemical Service should be recruited mainly from Indian sources, and that the Service must be staffed with men of the best type the Universities can produce. They hold, therefore, that the question of adequate chemical training in Indian Universities is vital.

The following is an abstract of the recommendations of the Committee :—

That a Chemical Service, to be called the Indian Chemical Service, be constituted, and be controlled by a Director-General, with headquarters at a central imperial chemical research institute at Dehra Dun; that the Director-General be assisted, in the first instance, by four deputy directors, in charge of (a) inorganic and physical chemistry, (b) organic chemistry, (c) metallurgical chemistry, (d) analytical chemistry; that a provincial research institute be established in each province under the control of the Local Government, each such provincial institute to be under a director of research.

The Central Imperial Chemical Research Institute should create new industries and carry out the development of new processes up to the semi-large scale, or further, if necessary; investigate problems of a fundamental character arising from the work of the provincial institutes which have been transferred to the central institute by local directors in consultation with a director-general; assist in the co-ordination of the work in progress in the provinces by means of personal discussions and periodical conferences; carry out analytical work and correlate the methods of analysis in general use throughout the country; maintain a bureau of information and record office; and issue necessary publications.

The functions of the provincial research institutes should be to maintain close touch with works, chemists, and industries, and to work out any problems which may be submitted to them; to develop new industries, worked out on the laboratory and semi-large scale by the central institute; to carry out other work necessary to establish and foster new industries peculiar to the province; to carry out analytical work required in the province and to erect and control sub-stations as the development of industry may require.

The recommendations also provide that a research institute should not manufacture in competition with private enterprise, but that the chemical industries developed under the scheme should be handed over to private firms as soon as practicable; that experts should be employed to establish chemical industries based on known processes; that the work of the central institute should be controlled by a Board, of which the director-general will be chairman, which will comprise the deputy directors and such other persons as the Government of India may determine. The central institute, however, will have no administrative control over the provincial institutes, except that no appointment as director of research should be made without consulting the director-general. Chemists employed at provincial institutes should be appointed by the Local Government in consultation with their

director of research and the director-general, and should be members of the Chemical Service seconded for service under the provincial governments, and paid by them. Agricultural chemists should not at present be included in the Service.

Recommendations are made with regard to the relations of the Chemical Service to the Forest Department, the Ordnance Department, the Chief Inspector of Explosives, Assay Masters, the Medical Stores Department, the Geological Survey, and other Government Departments employing chemists.

The Committee also recommend that a Ministry of Science be created.

With regard to existing chemical appointments, such as those of Provincial Government Analyst, the Committee recommend that the deputy director in charge of analytical chemistry should co-ordinate the methods of analysis throughout India, and should act in an advisory capacity to such analysts, who should be attached to each provincial research institute, should be under the control of the directors of research, and should take over the chemical work carried out by the Chemical Examiners. The question of the connection of the Indian Institute of Science, Bangalore, with the Chemical Service is to await proposals from the Council of that Institute. Members of the Service should be seconded to the Education Department and to University Institutions if required, and the Government should give maintenance and equipment grants to students undergoing training in the methods of research required for recruitment.

The report also contains proposals for pay, pensions and allowances, and for study leave regulations.

These latter proposals place the appointments of chemists on a basis more comparable with that of appointments relating to other professions than it has been in the past, and, if adopted, should result in the maintenance of a high standard of efficiency.

The report refers to "Assistant Chemists," where the expression "Chemical Assistant" would appear to be more applicable, in accordance with the scheme for the Home Government Chemical Service suggested by the Council of the Institute of Chemistry early in 1919. The Public Appointments Committee of the Institute of Chemistry who have had the report under preliminary consideration, understand that Prof. Thorpe would be willing to adopt the term "chemical assistant" where it applies to probationers.

A separate note by Sir P. C. Ray is added to the report, which appears to be in some measure opposed to the recommendations. He criticises the general principle of Government Departments starting new industries, although the Government of India has, in the past, successfully promoted the development of several industries.

There would appear to be a prospect of a considerably increased number of chemical appointments in India, but chemists are advised, as heretofore, to keep in touch with the Institute when they contemplate candidature for such appointments, in order to ensure that their positions carry suitable pay, status, and prospects.

April Examinations.

Abstract of the Report of the Board of Examiners.—The Examinations were held at the places and on the dates given below :—

Branch (*b*)—For the Fellowship, at the Institute, April 12th to 16th.

Branch (*d*)—For the Fellowship and Associateship, at the Institute, 12th to 15th April.

Branch (*e*)—For the Fellowship and Associateship and for the Certificate in Therapeutics, etc., at the Institute, April 12th to 16th.

Branch (*g*)—For the Fellowship and Associateship :—

In the Chemical Technology of Cement Manufacture, at the Institute, April 12th to 16th.

In the Chemical Technology of Textile Manufacture, at the College of Technology, Manchester, April 19th to 24th.

In the Chemical Technology of Coke Oven and By-Product Practice, at the University of Leeds, April 26th to 30th.

Fourteen Candidates presented themselves ; the number examined in each branch and the number of those who passed are shown in the following table :—

	NUMBER EXAMINED.	NUMBER PASSED.
Branch (<i>b</i>) Metallurgical Chemistry, for F.I.C.	1	0
Branch (<i>d</i>) Organic Chemistry :		
For A.I.C.	2	2
For F.I.C.	2	2
Branch (<i>e</i>) Chemistry of Food and Drugs, etc. :		
For A.I.C.	3	2
For F.I.C.	1	1
For the Certificate	1	1
Branch (<i>g</i>) : Chemical Technology of Cement—for		
A.I.C.	1	1
Chemical Technology of Textile Manufacture :		
For A.I.C.	1	1
For F.I.C.	1	1
Chemical Technology of Coke Oven and By-Product		
Practice :		
For A.I.C.	1	0
	14	11

The practical work of the successful Candidates in all branches was well carried out.

The following Candidates satisfied the Board :

For Fellowship.

Clayton, Ellis	..	..	..	Branch (g)—Chemical Technology of Textile Manufacture.
Clewer, Hubert William Bentley				Branch (d)—Organic Chemistry.
Eames, Robert Owen, B.Sc.	..			Branch (d)—Organic Chemistry.
Ratcliffe, Norman	..	..		Branch (e)—The Chemistry (including Microscopy) of Food and Drugs, etc.

For Associateship.

Appleyard, Frederick Norman				Branch (e)—The Chemistry (including Microscopy) of Food and Drugs, etc.
Bowman, Stanley	..	..		Branch (g)—Chemical Technology of Cement Manufacture.
Humphries, Ronald	..	..		Branch (g)—Chemical Technology of Textile Manufacture.
Lees, Arnold	..	..	..	Branch (e)—The Chemistry (including Microscopy) of Food and Drugs, etc.
Phillips, Sydney Bertram	..			Branch (d)—Organic Chemistry.
Pickering, Eric Charles, B.Sc.	..			Branch (d)—Organic Chemistry.

For the Certificate in Therapeutics, etc.

Dixon, Hanley, M.Sc., A.I.C.	..			Branch (e)—The Chemistry (including Microscopy) of Food and Drugs, etc.
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The papers and particulars of the exercises set are attached.

The thanks of the Council have been accorded to the authorities of the University of Leeds and the College of Technology, Manchester, for laboratory accommodation.

The Board of Examiners is indebted to Prof. J. W. Cobb for help in connection with the Examination in the Chemical Technology of Coke Oven and By-Product Practice, and to Prof. E. Knecht, in connection with the Examination in the Chemical Technology of Textile Manufacture. The Examination in the Chemical Technology of Cement Manufacture was conducted by Prof. C. H. Desch, Examiner in Metallurgical Chemistry.

Examination Papers : April, 1920.

Branch (b).—Metallurgical Chemistry. April 12th to 16th, 1920.

MONDAY, APRIL 12th : 10 a.m. to 1 p.m.

(Five questions only to be attempted.)

1. Give some account of the most important light aluminium alloys. What is the behaviour of these alloys when exposed to atmospheric corrosion ?

2. What is the effect of the composition of the gas on the working of an open-hearth steel furnace ? What steps would you take to control the uniformity of the gas ?

3. Describe in detail some form of recording pyrometer suitable for the control of an annealing furnace. How would you check the accuracy of the readings of the pyrometer ?

4. Describe the chemical reactions which take place in the Bessemerising of a copper matte.

5. How is copper refined electrolytically ? What valuable by-products may be recovered ? How is the bath treated when it becomes exhausted ?

6. What fluxes and deoxidisers are most suitable for use in a brass foundry ? Describe the purpose for which each is used.

7. Draw an equilibrium diagram for the alloys of two metals which form a complete series of solid solutions with one another, and explain how solidification of the alloys takes place.

TUESDAY and WEDNESDAY, APRIL 13th and 14th : 10 a.m. to 4.30 p.m.

Make a full analysis of the given alloy. (A high tensile brass, with nickel and aluminium.)

THURSDAY, APRIL 15th : 10 a.m. to 4.30 p.m.

Examine the given steel by means of the microscope. Sketch and report on its structure. Quench a portion from 900° C., and determine the change of structure.

FRIDAY, APRIL 16th : 10 a.m. to 4.30 p.m.

Examine the given ore, and determine its two principal constituents. (An impure galena.)

Branch (c).—The Chemistry (and Microscopy) of Foods and Drugs, etc. April 12th to 16th, 1920.

MONDAY, APRIL 12th : 10 a.m. to 1 p.m.

1. Give extended formulæ indicating the chemical structure of dextrose and fructose (lævulose) respectively. What physiological difference exists between the dietetic value of these two sugars in certain pathological conditions ? What products are formed respectively by the hydrolysis of cane sugar, starch, and inulin ? Mention any food substance in which the last-named occurs.

2. How would you detect and estimate sodium benzoate if used as a preservative in cream ?

3. Describe in detail a method for the determination of the percentage of starch as distinguished from other carbohydrates in, say, a sample of ground maize.

4. Mention some cases in which a drug is official both as a crude vegetable extract and as the pure active principle. Discuss the relative merits of each form of administration.

5. Enumerate the official preparations of mercury which are meant for external application. State what you know of the present use in therapeutics of organic preparations of arsenic.

6. Explain the therapeutic use of the following terms, and mention drugs to which they can be respectively applied : hypnotic, diaphoretic, ebolic, diuretic, and antipyretic.

MONDAY, APRIL 12th : 2 p.m. to 5 p.m.

1. A hypnotic drug is present in the mixture A. Identify it and obtain some indication as to its amount. (Chloral hydrate.)

2. Prepare microscopic slides from B, and make drawings of any structures which should serve to identify the drug. (Turkey rhubarb.)

3. Identify the structures on the slides C, D, E, and F.

TUESDAY, APRIL 13th : 10 a.m. to 4.30 p.m.

1. Determine the percentage of " fatty acids " in the sample of soap.

2. Ascertain the original gravity of the sample of beer.

WEDNESDAY, APRIL 14th : 10 a.m. to 4.30 p.m.

1. The organic compound A is a substance used medicinally. (Hexamethylene tetramine.) Determine the percentage of nitrogen in it ; examine it as fully as you can and identify it.

2. Examine the sample of raspberry jam microscopically only, and report on its purity. (The sample contained apple.)

THURSDAY, APRIL 15th : 10 a.m. to 4.30 p.m.

1. Determine the percentage of total calcium, stating it as lime, CaO , in the mineral phosphate (b).

2. Determine the percentage of " crude fibre " in the sample of feeding stuff which was commercially sold as " rice bran," and report your opinion of the sample.

FRIDAY, APRIL 16th : 10 a.m. to 4.30 p.m.

Examine the carbohydrate (z) polarimetrically and determine its copper-reducing power, and identify it. (Glucose.)

Branch (d).—Organic Chemistry. April 12th to 16th, 1920.

MONDAY, APRIL 16th : 10 a.m. to 1 p.m.

(Not more than five questions to be attempted.)

1. How are (a) carbamide and (b) thiocarbamide prepared, and how have their constitutional formulæ been ascertained ? Discuss any recent work on the exact constitution of the latter substance.

2. Describe methods by which the 1-2, 1-3, and 1-4 aliphatic diketones

can be prepared. Compare their properties and the manner in which substances containing closed chains can be obtained from them.

3. Describe the general methods by which azo-compounds are obtained, and give in detail the method of preparation of any one azo-dyestuff.

4. Discuss shortly the influence of the discovery of phenylhydrazine on the subsequent development of organic chemistry.

5. How has the constitution of uric acid been ascertained, and the relation between this acid and theobromine and caffeine?

6. Discuss Thiele's theory of partial valencies, and its application to the changes which take place in the reduction of substances containing conjugated double bonds.

TUESDAY and WEDNESDAY, APRIL 13th and 14th : 10 a.m. to 4.30 p.m.

1. A is a sample of ammoniacal liquor. Determine the amount of the following substances present in it :—

(a) Thiocyanate, calculated as NH_4CNS .

(b) Phenols, calculated as phenol, $\text{C}_6\text{H}_5 \cdot \text{OH}$.

(c) Pyridine bases, calculated as pyridine, $\text{C}_5\text{H}_5\text{N}$.

Results to be recorded in grams per litre.

THURSDAY and FRIDAY, APRIL 15th and 16th : 10 a.m. to 4.30 p.m.

B is a sample of crude benzyl chloride. Prepare from it (a) a sample of pure benzyl chloride and (b) a sample of phenylacetic acid. Determine the boiling point (corrected) of the products, and, if solid at the ordinary temperature, their melting points.

Prepare the barium salt of the organic acid C and determine the percentage of barium in it. (Oxalic acid.)

TRANSLATION.

Time allowed : 2 hours.

Translate into English.

Enfin, le procédé d'absorption par l'eau, inapplicable pour la benzine, mais applicable pour l'acétate de méthyle qu'elle dissout, a l'inconvénient, à cause du faible co-efficient de solubilité des éthers dans l'eau, d'obliger à l'emploi de masses considérables de liquide. L'extraction des solvants dissous dans l'eau se fait par distillation, ce qui exige une grande dépense de combustible.

Suivant les caractères physiques et chimiques des produits volatils que l'on veut extraire du gaz qui les contient, il peut y avoir intérêt à employer l'un ou l'autre de ces procédés, mais il résulte d'essais nombreux et concluants qu'ils peuvent tous permettre, en mettant en œuvre des moyens suffisants et appropriés, d'opérer presque intégralement la séparation de produits volatils d'avec les gaz inertes.

A. FUCHS.

Licencié ès sciences-physiques.

(*Chimie & Industrie*, Vol. 3, No. 2, Février, 1920, pp. 172-64T.)

Translate into English.

Es existiert noch eine zweite, leicht in den gewöhnlichen Aldehyd zurückführbare polymere Modifikation des Acetaldehyds, der ebenfalls die Molecularformel $C_6H_{12}O_3 = (C_2H_4O)_3$ zukommt: der Metaldehyd. Während der Paraldehyd namentlich bei mittlerer und höherer Temperatur sich bildet, entsteht der Metaldehyd vorzugsweise in der Kälte. So scheidet er sich in feinen Nadeln ab, wenn man zu Aldehyd kleine Mengen von Salzsäuregas, schwefliger Säure oder verdünnter Schwefelsäure bringt und sofort abkühlt; beim Aufbewahren von unreinem Aldehyd bildet er sich zuweilen in mächtigen Spiessen. Es wird indes stets nur ein kleiner Teil des Aldehyds in Metaldehyd verwandelt; daneben bildet sich immer Paraldehyd in beträchtlicherer Menge. Der Metaldehyd ist in Wasser unlöslich, in Alkohol wenig löslich, etwas löslicher in Benzol und Chloroform. Bei raschem Erhitzen sublimiert er, ohne vorher zu schmelzen, in Form verworrener feiner Nadeln, indem daneben gewöhnlicher Aldehyd erzeugt wird; durch Erhitzen auf ca. 200° im geschlossenen Rohr kann er vollständig in gewöhnlichen Aldehyd verwandelt werden.

MEYER AND JACOBSON.

Translate into English.

Un buen método (cuando se dispono de un lote bien pulverizado) consiste en colocar el mineral en un depósito con un pequeño orificio en la parte inferior y hacerlo caer sobre el vértico de un cono macizo de modo que el mineral se reparta homogéneamente sobre las regiones vecinas a la base del cono; luego se toma una región donde se ha acumulado el mineral y se repite la operación con otro cono más pequeño y pulverizando más finamente la porción tomada. Procediendo de este modo el común obtenido representa la muestra media de la partida. Este procedimiento tiene la ventaja de que es más práctico pues es automático y se ahorra mucho tiempo.

El método para evaluar anhídrido túngstico en los minerales concentrados de tungsteno, que indicamos con tanto detalle pues creemos que para este caso la más pequeña variación en el modo operatorio se traduce en la variación de la cifra final, es el siguiente:

La totalidad de la muestra remitida por los solicitantes (200 a 1,000 grs.) se pulveriza perfectamente en un mortero de hierro y luego se tamiza en un tamizador metálico No. 100; la totalidad de la muestra tamizada se homogeiniza perfectamente pues las porciones que pasan por el tamiz tienen distinta composición; primero pasan las partes más blancas y luego las más resistentes a la pulverización.

De este lote total bien mezclado se toma una muestra media de 3 a 5 grs. la que se porfi riza hasta reducirla a polvo impalpable.

Boletin No. 11.

Serie D (Química Mineral y Aguas Minerales).

Branch (g).—Chemical Technology of Coke Oven and By-Product Practice. April 19th. to 23rd, 1920.

PAPERS IN GENERAL CHEMICAL TECHNOLOGY (see pp. 196, 197).

TUESDAY, APRIL 20th : 10 a.m. to 1 p.m.

(Four questions only to be answered.)

1. Write a short essay on the place of by-product coking in national industry, with special reference to (a) conservation of fuel, (b) economic aspects, (c) national defence.

2. How would you proceed to make a choice of a brick material to be used in the construction of (a) the oven walls, (b) the regenerators?

3. What do you know of (a) the occurrence of salt in coking coal, (b) its effect on the oven wall, and (c) the means available for mitigating the trouble due to salt.

4. Discuss the relative merits of waste heat and regenerative systems of oven.

5. Discuss the suitability of coke-oven gas for public supply, and show how the special requirements of the latter can be met.

TUESDAY, APRIL 20th : 2 p.m. to 5 p.m.

(Four questions only to be answered.)

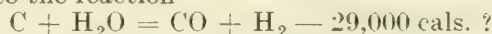
1. What qualities are desirable in a coal to be used for the manufacture of high-grade metallurgical coke? What preliminary treatment may be applied to the coal to render it more suitable for coking?

2. Write a short account of the chemical changes which occur in the oven during carbonisation, with special reference to (a) the hydrocarbons, and (b) the ammonia, of the volatile matter.

3. Discuss the relative merits of direct and indirect processes for the recovery of sulphate of ammonia. Give a clear account, with sketches, of any sulphate plant with which you are familiar.

4. Sketch the plant necessary to produce from coke-oven gas (a) crude benzol, (b) pure products. Show how the process may be modified when it is necessary to reduce the naphthalene-content of the gas.

5. Calculate the heat capacity of one ton (metric) of coke pushed from an oven at $1,000^{\circ}\text{C}$. If steam at 100°C . were blown into this coke, how much steam would the sensible heat of the coke suffice to decompose at $1,000^{\circ}$ according to the reaction



Specific heat of coke per kg. = $0.2142 + 0.000166 t$.

Specific heat of CO and H_2 (mean per grm. mol.), $6.8 + .006 t$.

WEDNESDAY and THURSDAY, APRIL 21st and 22nd : 10 a.m. to 4.30 p.m.

(You are expected to complete Exercise 1 and, also, either Exercise 2, Exercise 3, or Exercise 4.)

1. It is required to decide whether a coal, of which a small sample is supplied to you, is suitable for by-product coking. Make an examination, as full as time permits, so as to form an opinion on the question.

2. Determine the calorific value of the sample of coal furnished.

3. Make an analysis of the town gas supplied at your bench.

4. You are supplied with a sample of crude benzol. Make as complete an examination of this as you are able in the time available.

Branch (g).—Chemical Technology of Cement Manufacture.
April 12th to April 16th, 1920.

GENERAL CHEMICAL TECHNOLOGY.

MONDAY, APRIL 12th : 10 a.m. to 1 p.m.

(Four questions only to be answered.)

1. Discuss the action of the following substances on aluminium :—
(a) Hydrochloric acid, (b) sulphuric acid, (c) nitric acid, (d) citric acid, (e) common salt, and (f) borax. Mention any uses to which aluminium

is put in chemical industry, state the method of welding the metal, and indicate the composition of the flux used.

2. Specify the materials, including any necessary cements, which you would recommend for the construction of (1) pipe lines for conveying (a) hydrochloric acid gas, (b) nitric acid; (2) pans for evaporating aqueous solutions of (d) ammonium chloride, (b) caustic soda to the point of fusion. Sketch the setting of a caustic soda pot.

3. You are required to measure a temperature in the neighbourhood of $1,200^{\circ}\text{C}$. Sketch and describe the apparatus you would use, stating any precautions necessary to ensure the accuracy of the observation.

4. Sketch and explain the arrangement you would use to take a sample of hot gas from the top of a producer, and describe the method of analysing the gas.

5. You are required to make a thermal balance of a boiler setting, showing the proportion of the original heating value of the coal, (a) in the steam generated, (b) carried away by the flue gases, (c) in the form of unburnt matter and (d) lost by convection and radiation: describe the procedure, without discussing details of the actual measurements.

6. Discuss the relative values of gas and coal for the generation of heat and power. Sketch a gas-fired regenerative furnace, and explain the method of operating it.

2 p.m. to 5 p.m.

(Four questions only to be answered.)

1. You are required to reduce limestone (a) to walnut size, (b) to pass a 10-mesh sieve, (c) to an impalpable powder; make a rough sketch of one machine for each purpose and explain its operation.

2. Sketch one form of (a) gas washer, (b) gas tower scrubber, discussing, in the latter case, the various kinds of packing and the methods of distributing the scrubbing liquid.

3. Sketch and describe a filter press with arrangements for washing the filter cake. State any modification of the construction or method of operation necessary in dealing with slimy materials.

4. You are required to recrystallise some tons of a solid from water, to separate an insoluble ingredient, and to dry the purified crystals mechanically. Sketch the general arrangement of the necessary plant and give a detailed drawing of the dissolver and the drier.

5. Sketch any drying apparatus using heated air, and discuss the conditions necessary to secure efficiency. Assuming the air to leave the drying chamber saturated with water vapour, explain the method of calculating the weight of water carried off by 1 kg. of dry air.

6. Sketch the plant you would recommend for the evaporation, under reduced pressure, of a thin liquid and for the removal of crystals which separate during concentration. State any modifications you would suggest in the case of a viscous liquid. What are the advantages of evaporation in vacuo over evaporation under atmospheric pressure?

TUESDAY, APRIL 13th : 10 a.m. to 1 p.m.

(Four questions only to be attempted. Where possible, give equations and sketches.)

1. Describe the efforts that have been made to recover potash from the dust carried by flue gases from cement kilns. Under what conditions is

such a process likely to be successful? How would you arrange the plant so as to obtain the maximum recovery of dust?

2. What do you consider the best method of lining a rotary kiln? Describe the action of cement clinker on the usual materials employed for lining, and mention the difficulties to which it gives rise.

3. Give an account of some modern method of manufacturing Portland cement from blast-furnace slag, giving the composition of a suitable slag and of the resulting cement.

4. What are the characteristics of a cement which will resist the action of sea water when made into concrete? Explain the chemical changes which take place when concrete is disintegrated by sea water.

5. Describe in detail a wash mill for the manufacture of cement from chalk and clay.

6. How would you determine the suitability of a coal for use in the coal-dust firing of a rotary kiln? What are the most important characteristics of such a coal?

TUESDAY, APRIL 13th : 2 p.m. to 5 p.m.

(Four questions only to be answered. Where possible, give equations and sketches.)

1. Define "Roman" and "natural" cements. Explain how they differ chemically from Portland cement, and give the tests which you would make to determine their value.

2. What factors affect the setting time of a Portland cement? Give a chemical explanation of the differences of setting time of different cements, and explain how the time may be artificially controlled.

3. Discuss the relative advantages of the principal types of mill used for grinding clinker.

4. Give some account of the microscopic structure of cement clinker, and show how this method has been employed to determine the chemical constitution of clinker.

5. What tensile strengths would you expect to find in testing a first-class Portland cement after seven days, twenty-eight days, and three months, under standard conditions, (a) from neat cement, (b) from a standard mortar? Which is the more valuable test of the real quality of the cement, and why?

6. What are the advantages of very fine grinding of cement? Describe methods which have been adopted for the separation of the very finest particles from coarser particles, and indicate how cements may be further improved in this direction.

WEDNESDAY, APRIL 14th : 10 a.m. to 4.30 p.m.

1. Make as full an analysis as time permits of the given sample of marl.

(This exercise may be continued to-morrow.)

2. Examine the sample of cement for admixed slag, and give your reasons for your conclusions.

THURSDAY, APRIL 15th : 10 a.m. to 4.30 p.m.

1. Complete the analysis of the marl.

2. Examine the sample of defective cement, and state the reason for its bad quality.

Branch (g).—Chemical Technology of Textile Manufacture.
April 26th to 30th, 1920.

GENERAL CHEMICAL TECHNOLOGY.

MONDAY, APRIL 26th : 10 a.m. to 1 p.m.

(Not more than five questions to be attempted.)

1. Describe in outline the methods you would adopt for taking a sample of coal and carrying out the following determinations :—

- (1) Moisture.
- (2) Ash.
- (3) Calorific value.

2. Sketch and describe a suitable form of apparatus for the production of hypochlorite of soda by electrolysis. Explain the process from the point of view of the ionic theory.

3. How are percarbonate of potash and perborate of soda prepared ? What is the composition of these substances, and for what purposes are they chiefly used ?

4. Give some account of the rusting of iron and steel, and state what means have been applied for its prevention.

5. Classify the inorganic reducing agents which are used on a large scale. Give in each case the composition of the substance and an example of its industrial application.

6. How are stannous and stannic chlorides prepared, and what are the characteristic properties of each ? For what purposes are these salts chiefly used ?

2 p.m. to 5 p.m.

(Not more than five questions to be attempted.)

1. What is the object of vulcanising rubber, and how is this ordinarily achieved ? In what respects does the vulcanised product differ from the original (unvulcanised) ?

2. How is starch paste affected (a) by boiling with dilute hydrochloric acid, (b) by treatment in the cold with dilute caustic soda, (c) by warming to 60° C. with malt extract ?

3. What are the principal constituents of ordinary American rosin ? Give some account of Herty and Willard's work on the resins in adversely affecting the detergent power of rosin soaps.

4. Give an example of the application of a catalyst (in any large-scale operation) in the manufacture of an organic compound, and explain its action.

5. How are naphthalene and anthracene isolated from coal tar, and how are they purified for use on a large scale ?

6. Enumerate the modes of formation and the principal reactions of the diazo-compounds of the aromatic series.

TUESDAY, APRIL 27th : 10 a.m. to 1 p.m.

(Not more than five questions to be attempted.)

1. When wool which has been boiled with very dilute sulphuric acid and then with water is dyed in a neutral bath with crystal scarlet, a full and level shade is obtained. What changes occur, according to Fort, in this process ?

2. A large proportion of the sulphide colours are known to yield shades of excellent fastness on cotton. What circumstances have mitigated against the more general application of these colours in dyeing ?

3. Cotton mercerised with nitric acid is found to take up vastly more indigo than cotton mercerised with caustic soda, when the two are dyed in the same vat. How is this accounted for ?

4. How may a paranitraniline resist be obtained in calico printing under vat-dyed indanthrene blue ?

5. What is naphthol A.S., and how do the results obtained with it in the production of insoluble azo-dyes compare with those obtained with beta-naphthol ?

6. Describe Warr's process for fixing the direct colours in dyeing and printing. What are the chief drawbacks to the process from the point of view of economy ?

TUESDAY, APRIL 27th : 2 p.m. to 5 p.m.

(Not more than five questions to be attempted.)

1. The textile fibres are said to be colloidal in character. State exactly what is meant by this. What evidence can you adduce to prove the colloidal character of cellulose ?

2. Give in outline a description of the three principal methods employed for the manufacture of artificial silk.

3. In what manner is cotton affected by heat and by light ?

4. What advantages are claimed for the scouring of wool by means of volatile solvents as compared with the ordinary process of scouring with soap ?

5. What is the amount of nitrogen usually met with in raw cotton, and in what operations in the bleaching process is it principally removed ?

6. State what you know regarding the composition of yolk (lanoline), cotton wax, and flax wax. How are these substances acted upon by aqueous alkalies ?

THURSDAY, APRIL 29th : 10 a.m. to 4.30 p.m.

1. Identify the fibres in the given materials and submit the dry mounts which you have prepared for the microscopic examination.

2. You are requested to carry out a valuation of the sample of hydro-sulphite of soda submitted.

FRIDAY, APRIL 30th : 10 a.m. to 4.30 p.m.

1. Identify the colouring matters in the dyed and printed fabrics submitted.

2. Estimate quantitatively the amount of dyestuff in each of the two solutions submitted (methylene blue and orange II.). Express your results in grams per litre to the third decimal.

WEDNESDAY, APRIL 28th : 3 p.m. to 5 p.m.

TRANSLATION.

GERMAN.

In neuerer Zeit werden Perchlorate hauptsächlich elektrolytisch dargestellt, wobei NaCl als Ausgangsmaterial dient. Es entsteht zuerst Chlorat und bei weitergehender Elektrolyse Perchlorat. Durch doppelte Umsetzung mit den betreffenden Chloriden kann man dann das K- oder NH_4 -salz darstellen. Ist die Elektrolyse so weit fortgeschritten, dass sich nur noch Chlorat in Lösung befindet, *Winteler* bei weitergehender Elektrolyse die besten Bedingungen zwischen Platin und Superoxydelektroden folgende; (1) Saure Lösung an der Anode; (2) tiefe Temperatur an der Anode; (3) Stromdichte 8–12 Amps/qdm; (4) Hohe Konzentration des Elektrolyten. Wichtig ist die direkte Kühlung der Elektroden, sie sollen nur einseitig mit dem Elektrolyten in Berührung kommen, dann findet auch bei ganz geringer Kathodenstromdichte keine Reduktion statt. Charakteristisch für die Perchloratbildung ist das Auftreten eines starken Ozongeruchs. Für die technische Darstellung ist nach *P. Lederlin* ein Zusatz von Bichromat empfehlenswerth. Man erreicht dadurch eine hohe elektrochemische Ausbeute unter andauerndem Gebrauch der gleichen Lösung und derselben Kathoden. Nach dem Zusatz von Chromat lässt man in bestimmten Zwischenräumen geringe Mengen HCl zufließen, welche die Bildung von Bichromat veranlasst.—GEUTHER.

FRENCH.

L'alteration provoquée par la teinture en bain acide est, si nous en rapportons aux allegations de *Suida* et de ses collaborateurs, d'ordre purement hydrolytique. Elle est, par analogie avec les protéines solubles, l'effet d'une dislocation de certains enchaînements qui relient les radicaux constitutives de la laine. Quelle que soit l'importance de cette dislocation, elle sera évidemment adéquate au nombre des nouveaux groupements fonctionnels qui manifestent leur existence, par exemple, par l'avidité de fixer des matières colorantes. Ces groupements fonctionnels, par leur activité chimique rapprochent la laine des protéines solubles et lui confèrent entre autres, aussi la propriété de se lier aux tungstates, molybdates et analogues, pour former des combinaisons indissociables par l'eau.—BATTEGAY.

Candidates were examined orally in General Chemistry.

TESTS FOR LABORATORY RESISTANCE GLASSWARE

THE Glass Research Committee of the Institute have prepared a scheme for testing laboratory glassware, which is recommended to the notice of manufacturers and users.

The National Physical Laboratory have agreed generally with the tests.

The object of the tests described in the following pages is to characterise such chemical glassware as may safely be considered "resistance" glass. The tests are the minimum which such glass ought to answer, many brands of chemical glassware being available which will pass much more stringent tests. No attempt is made to distinguish between different makes of "resistance" glass, neither are the tests intended to ascertain the extreme limit of resistance to which glass can be carried. For the latter purpose other methods are available which have been proposed from time to time in the literature on the subject. For the protection of the user, however, the tests described herein afford a simple means of ascertaining whether glass has any claim to be considered of "resistance" quality for ordinary chemical operations. For special purposes—toxicological and other—the user is of necessity compelled to make his own tests for the specific purpose under consideration. Thus certain glasses, of good quality in other respects, contain arsenic or antimony which are sometimes soluble to a small extent in sodium hydroxide solution. While such glass may frequently be used safely with acids, the use of even dilute alkali is attended by the risk of dissolving a little arsenic or antimony.

I. PRELIMINARY TREATMENT.

Heat distilled water just to boiling point in flask or beaker, rinse vessel, and pour out. Rinse with a little 5% acetic acid with the addition of some pieces of filter paper, and then clean thoroughly with hot distilled water.

II. TREATMENT IN AUTOCLAVE.

The Autoclave test furnishes a rapid sorting test for resistance glass. It is of special value when glass is required for use in certain stability tests conducted under pressure, in which case the insolubility of the alkali of the glass is of the utmost importance.

Fill flask or beaker with distilled water, place in autoclave containing water. The vessel should be supported ABOVE THE SURFACE OF THE WATER on a pure silver plate surrounded with a cylinder of pure silver foil, the cylinder being covered with another pure silver plate. (By distilled water is understood ordinary ammonia free distilled water checked for any possible residue.)

Heat in autoclave for three hours at registered pressure of four atmospheres. Evaporate half the water from the flask or beaker in a platinum dish, heat the residue for one hour at 120° C., gently ignite (not above 650° C.) for not more than three minutes and weigh. Express the result as mg. RESIDUE PER SQUARE DECIMETRE, calculating on the area of the interior surface of the vessel. Determine the alkalinity of the remaining half by titration with N/10 (or N/100) H₂SO₄, using methyl orange as indicator. Express the result as c.c. N/100 H₂SO₄ per square decimetre.

Note appearance of vessel after drying.

If pure silver is not available no serious effect on the result will occur by using either form of vitreous silica for the plate and cover, and copper for the cylinder.

III. TREATMENT WITH REAGENTS.

(a) Place 100 c.c. of concentrated hydrochloric acid (sp. gr. 1.15) in another flask or beaker, treated as in I,

cover the mouth of the vessel with platinum foil and heat in an air bath so that the acid boils gently for half an hour.

The air bath should be of such a size as to give approximately 3 cms. clearance at the greatest horizontal diameter of the flask. A thermometer should be placed in the air bath space, the bulb level with the centre of the vessel, and the temperature should be kept at $140^{\circ}\text{C.} \pm 5^{\circ}$.

Evaporate the acid to dryness in the vessel in the air bath and repeat the whole process twice.

Acidify and wash out with distilled water the residue from the three treatments into a platinum dish and evaporate to dryness. Sprinkle a weighed amount (say 0.1 gram) of powdered ammonium carbonate over the residue and ignite. Repeat this treatment with ammonium carbonate twice and weigh residue. Deduct from this the weight of residue obtained by evaporation of 300 c.c. of the hydrochloric acid treated with ammonium carbonate as above.

Dry the flask or beaker and note appearance.

Express the result of this treatment as mgm. extracted per square decimetre, assuming the whole inside of the vessel to be subject to attack.

The whole of the above treatment with hydrochloric acid should be repeated, using the same vessel.

(b) Test for silica by fusing the combined residues with sodium and potassium carbonates, extracting with water and evaporating the extract to dryness on the water bath with hydrochloric acid. Repeat this evaporation with hydrochloric acid twice more. Extract the residue with dilute hydrochloric acid and test for zinc.

Dry vessel and note appearance.

(c) After the treatment with hydrochloric acid, place in the vessel 50 c.c. 2N ammonium chloride solution (freshly made) and 50 c.c. of a solution of ammonia (1 part of 0.88 ammonia solution and 3 parts of water) and boil the solution for half an hour, the vessel to be heated on a hot plate covered

with asbestos, the mouth of the vessel being covered with platinum foil.

Evaporate the solution to dryness in a platinum dish, dry at 105°C. , drive off the ammonium chloride and ignite. Weigh the residue. Deduct from this the residue obtained from 50 c.c. ammonium chloride + 50 c.c. ammonium hydroxide solutions.

Express the result as mg. extracted per square decimetre, assuming the whole inside area of the vessel is subject to attack.

Dry vessel and note appearance.

(d) Sodium hydroxide treatment:—Glass which becomes opaque and flakes badly under this test is unsuitable for a large number of laboratory operations, *e.g.*, where contamination of the contents of the vessel must be avoided. Place 100 c.c. of 2N sodium hydroxide solution in another weighed vessel, counterpoised against a similar vessel, and boil four hours on a hot plate covered with asbestos.

A pure silver test tube, through which a stream of cold water is passing, is placed in the neck of a flask to act as a reflux condenser. In the case of a beaker a round-bottomed pure silver flask is employed.

Wash out vessel, dry, re-weigh, and note appearance.

Test the sodium hydroxide solution and deposit, if any, for the presence of zinc and lead.

Repeat the whole process.

IV. HEAT TESTS: ALTERNATIVE METHODS.

(a) Heat another flask or beaker in an air oven to 120°C. for at least half-an-hour. Immerse quickly in cold water (14° — 15°C.).

In carrying out this test the neck of the flask is attached by means of clamps to a movable rod in a specially constructed air oven, in such a way that the bottom of the oven may be removed and the flask suddenly immersed in cold water contained in a vessel placed underneath. A thermo-

meter is suspended inside the flask, and the vessel is not plunged into the water until this thermometer has registered a constant temperature of $120^{\circ}\text{C}.$ for at least ten minutes.

(b) Fill the vessel about three-quarters full of soft paraffin wax, and heat in an air bath in the first instance to about $155^{\circ}\text{C}.$ Remove from the air bath, stirring the molten wax and reading the temperature with a thermometer. When the temperature has fallen to $150^{\circ}\text{C}.$ plunge the vessel in water at $15^{\circ}\text{C}.$ Repeat at increasing temperatures, at intervals of $25^{\circ}\text{C}.,$ until the vessel breaks. Good quality vessels withstand this test at over $200^{\circ}\text{C}.$

(c) Boil a solution of calcium chloride (sp. gr. 1.33 at $15.5^{\circ}\text{C}.$) for five minutes in another vessel. Plunge into water at $0^{\circ}\text{C}.$

(d) Immerse another flask or beaker full of water at $0^{\circ}\text{C}.$ in boiling water.

Vessels should not crack when submitted to tests under (a), (c) and (d).

V. TESTS FOR ARSENIC AND ANTIMONY.

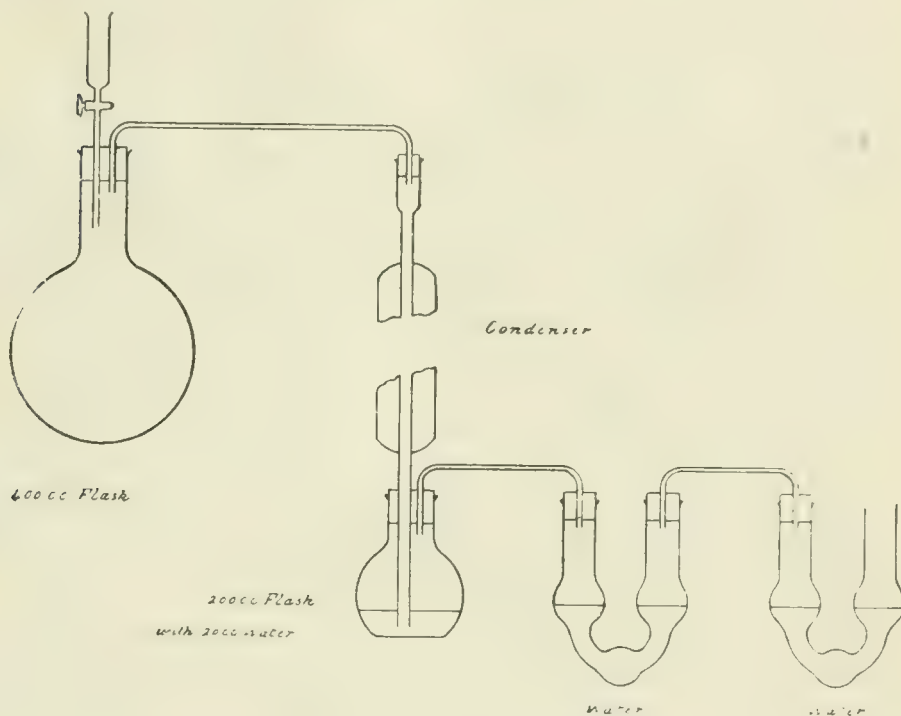
Chemical laboratory glassware should be free from arsenic and antimony.

The following test is recommended for arsenic :—

Ten grams of the glass vessel, in pieces of about one half to one inch square, are placed in a round-bottomed flask of about 400 c.c. capacity. To this is added 100 c.c. of arsenic-free hydrochloric acid (sp. gr. 1.15) and 100 c.c. of a solution of ferric chloride dissolved in arsenic-free hydrochloric acid, and 2 grams of arsenic-free ferrous sulphate crystals.* The mixture is distilled, and 75 to 100 c.c. of the distillate is collected. The distillate is tested for arsenic, the method of

* Another Method. The ferric chloride solution is placed in the flask and distilled alone (50 c.c. distillate being collected), so that its freedom from arsenic is ascertained first of all. The liquid is then cooled, the pieces of glass are added, and are followed by 150 c.c. of hydrochloric acid. The test is then carried out as above.

testing depending upon the amount of arsenic obtained. If more than 0.5 mg. calculated as arsenic is found, then the arsenic in the distillate is precipitated by sulphuretted hydrogen and the arsenic sulphide is weighed on a Gooch's crucible; or the arsenic may be estimated by titration with iodine solution after neutralising the acid with sodium bicarbonate in the usual way.



APPARATUS FOR DISTILLATION.

When it is necessary to determine minute quantities of arsenic, the distillate is examined by means of zinc as described in the British Pharmacopœia, 1914 (production of yellow stain with mercuric chloride), an aliquot portion of the distillate being used.

Alternatively, the acid solution may be evaporated with the addition of sodium carbonate and bromine or nitric acid, the residue reduced by means of potassium meta-bisulphite and the arsenic estimated in an electrolytic apparatus, using standard mirrors for comparison.

Glassware to be used for analytical operations should not yield arsenic under these conditions.

The apparatus is shown in the sketch. Rubber stoppers must not be used; corks are satisfactory, and these must be replaced periodically. The tap funnel serves for the introduction of the liquids and to prevent backrush of the liquid during distillation.

If possible the whole apparatus should be made with ground glass joints.

The arsenic-free ferric chloride solution is prepared by dissolving 400 grams of pure ferric chloride in a litre of hydrochloric acid (sp. gr. 1.15), adding 20 grams of ferrous sulphate crystals and then distilling until the distillate is free from arsenic. The original volume is then restored with arsenic-free hydrochloric acid. All the reagents used for the tests must be free from arsenic, or the minute amount of arsenic present in them must be accurately determined and allowed for.

The apparatus suffices for all ordinary purposes. Certain kinds of glass vessels used for storage may be tested by allowing arsenic-free hydrochloric acid to stand in the vessel for, say, forty-eight hours (or by shaking with the acid for any convenient period) and then testing the acid by the B.P. or electrolytic process.

Glassware yielding appreciable amount of arsenic under the test should be rejected for general laboratory use. It is also to be noted that while glass may give no test for arsenic on the first treatment with acid, yet prolonged use may render some of the arsenic soluble in acid.

There appears to be no need to test the substance of the glass in a finer state of division than that described above, but if desired this should be done after fusion of the powdered glass with sodium carbonate, acidification of the melt with hydrochloric acid, reduction and distillation of the arsenic chloride as before.

The possibility of glass not yielding arsenic under acid treatment, but doing so under treatment with alkali, has not been considered in this scheme.

Certain brands containing antimony have proved unexceptionable in use, but the user ought to be informed of the presence of antimony, etc. A satisfactory test for antimony can only be made by analysis of the glass. The most ready method is to dissolve it in hydrofluoric and sulphuric acids and determine the antimony after expulsion of most of the excess of hydrofluoric acid by heating.

VI. ANNEALING.

The vessels should be examined under polarised light in order to detect the presence of internal stresses. They should show no marked or irregular strain.

CONVENIENT DIMENSIONS OF VESSELS TO BE USED FOR TESTING.*

A. Flask.

Flat-bottomed spherical flask—

Height = 15.6 cm.

Total volume = 365 c.c.

Diameter of sphere = 8.8 cm.

Height of neck = 7.2 cm.

Internal diameter of neck = 2.2 cm.

Total internal surface = surface of sphere + surface of neck = 292.7 sq. cm. approximately.

= 3 sq. dm. approximately.

B. Beaker.

Cylindrical beaker—slightly tapering.

Dimensions—

Height = 10.8 cm. Total volume = 330 c.c.

Diameter of base = 6 cm.

„ „ top = 6.7 cm.

Mean diameter = 6.4 cm.

Internal surface = curved surface of cylinder + area of base = 245.3 sq. cm. approximately.

= 2.5 sq. dm.

* It is suggested that vessels approximating to these sizes should be selected for testing.

MAXIMA FOR RESISTANCE GLASS.**Autoclave Test.**

Residue.—Must not exceed 4 mg. per sq. dm.

Alkalinity.—Should not require more than 5 c.c. N/100 H_2SO_4 per sq. dm.

The glass must not flake or peel.

Hydrochloric Acid Test on Evaporation to Dryness.

1st treatment. Residue must not exceed 2 mg. per sq. dm.

2nd treatment. Residue must not exceed 1 mg. per sq. dm.

Ammonia and Ammonium Chloride Test.

Residue must not exceed 1.5 mg. per sq. dm.

* * * Physical and mechanical tests are under consideration and may be added if experience shows their necessity.

TESTS FOR LABORATORY PORCELAIN

ADOPTED BY THE SUB-COMMITTEE ON PORCELAIN OF THE GLASS RESEARCH COMMITTEE OF THE INSTITUTE.

GOOD hard porcelain should sustain fairly sudden changes of temperature without fracture. The glaze should be free from pin-holes, crazing and other defects, and the body should be non-porous.

For testing purposes the smaller sizes of crucibles and hemispherical basins are most convenient. The following notes are useful as a guide to manufacturers as indicating chemists' requirements. The results of the tests will also give chemists some idea of the limited uses to which the less perfect makes may be put.

1. APPEARANCE, SHAPE, WEIGHT, etc.

The general appearance and finish of the ware should be noted. It should at least come up to that of the porcelain

in former use in our laboratories. The weights of vessels should not exceed pre-war average weights for articles of similar size.

2. TESTS FOR POROSITY OF BODY AND IMPERFECTIONS IN GLAZE (DYE TEST).

A 0.5 per cent. solution of eosin in water answers well for this test. Some of the specimens should be simply filled with the solution; others and broken pieces of the wares completely immersed in it. After eighteen hours' soaking the articles should be rinsed with water, dried with a cloth, and examined with a hand lens.

Good porcelain exhibits no staining at all after this treatment, but inferior ware may show any or all of the following defects:—

General cracks; crazing, pin-holes, and other defects in glaze; porosity of body.

If the body is porous, a pin-hole defect or crack in the glaze will be surrounded with a shading or fringe of colour, or if the glaze is perfect on the inside the dye may enter through the unglazed surfaces on the outside of vessels. The body, although not actually porous, may be more or less vesicular, in which case a coarse staining of unglazed portions may occur.

The edges of the fragments should be examined to ascertain whether the body is at all porous or vesicular. (In some inferior specimens, although the body is non-porous, a creeping effect of the stain between the glaze and the body may be observed at places where there is imperfect union of the two.)

If the articles fail under this "dye" test it is extremely unlikely that they will survive the remaining tests in a satisfactory manner.

3. RESISTANCE TO HEAT AND SUDDEN CHANGES OF TEMPERATURE.

The basins and crucibles should be cleaned with acid (hydrochloric), washed, dried, and then heated in the water oven

for four to six hours. (This preliminary treatment is often necessary, particularly in cases where the specimens have shown defects under the dye test.)

(a) **Heating followed by cooling on cold triangles.**—Six crucibles, etc., supported on pipe-clay triangles, or similar rests, should be heated by direct application of Bunsen burners; when fully heated, they should be lifted off with small cold tongs and placed on cold pipe-clay triangles to cool. The treatment should be repeated six times. The vessels must then be soaked in the eosin solution for twelve hours, after which they should be washed, dried, and examined for cracks or other defects.

(b) **Heating followed by cooling on cold metal.**—The basins, etc., used in the above tests must again be thoroughly dried by heating for some hours in the water oven. They are then to be heated by direct flames, and when red-hot lifted off their supports with cold tongs and placed on cold metal (clean sheet lead) to cool. After heating and cooling six times, the vessels must be soaked in eosin, etc., and re-examined for further cracks or defects.

Note.—It is of primary importance that chemical ware should resist, without fracture, ordinary heating operations. The act of placing a red-hot porcelain article on cold metal to cool cannot be defended, as it is quite unnecessary in any laboratory work, but is justified in a scheme of testing as a simple means of ascertaining the effect of very sudden cooling.

4. CONSTANCY OF WEIGHT AND RESISTANCE OF GLAZE TO HIGH TEMPERATURES.

(a) Two new cleaned and weighed crucibles and basins should suffer no loss of weight after heating for several hours at a good red heat, and should show no tendency to stick to pipe-clay, silica or other supports.

(b) The condition of the glaze should be noted after heating for four hours at 950°C . No blistering or coaging should result.

5. CLEANING TEST.

Small basins and crucibles, after washing, should be dried in the water oven for four hours, gently ignited, cooled and weighed. They should then be allowed to stand in dilute acid (one vol. concentrated hydrochloric acid + one vol. of water) for about twelve hours. After this they should be rinsed, wiped dry with a cloth, and immediately ignited. After cooling, the weights should be found unaltered, and the subsequent application of the dye test should reveal no cracks or flaws.

Under this test, if the body is porous, or vesicular, liquid will have entered through unglazed surfaces, or through defects in the glaze, and on the application of sudden heat particles of porcelain or glaze will be thrown off by vapour generated from the imprisoned liquid.

It is obvious that if any variety of porcelain fails badly under this simple test its use in the laboratory will be limited, and it would often be necessary to heat basins and crucibles in the water oven for hours, to dry out absorbed liquid, before they could be safely ignited in the ordinary way.

6. RESISTANCE OF GLAZE TO ACID AND ALKALI.

Comparative trials should be made with high-grade pre-war dishes of similar size and shape. Weighed dishes should be filled with concentrated hydrochloric acid, covered with clock glasses and heated on the water bath for four hours. After washing, drying and igniting, the weights must be again taken and any alteration recorded.

The same dishes may subsequently be filled with 5 per cent. carbonate of soda solution, covered with clock glasses, and heated on the water bath for four hours; any evaporation which occurs during the heating must be made up by the addition of distilled water. After treatment the dishes must be washed, rinsed with dilute acid, dried, ignited and re-weighed in order that relative losses may be ascertained.

The same dishes may similarly be treated with 5 per cent. caustic soda solution and further losses of weight determined.

Any losses of weight found under these trials should not compare unfavourably with the losses sustained by the basins used as controls.

Examinations for lead should also be made, as the presence of this metal in the glaze, and the possibility of its extraction by reagents, must not be overlooked.

Simple test for lead.—Place two drops of pure hydrofluoric acid on the glazed surface and place the ware on the cover of a steam bath. Let it remain until the acid has evaporated. When dry touch the spots attacked with a drop of sulphuretted hydrogen water acidulated faintly with hydrochloric acid. Development of a brown or black stain indicates lead (or copper, etc.). The best ware shows no discoloration on treatment with aqueous sulphuretted hydrogen. The test is generally applicable, but may fail with very porous bodies into which the liquids pass during treatment.

Another useful test consists in heating to bright redness fragments of porcelain, or combustion boats, in a current of hydrogen for 4 hours. If lead or other metal reducible under those conditions is present in sensible amount, the glaze will darken. If the blackening is marked, the change will be accompanied by loss of weight. The best porcelain remains practically unaffected by heating in hydrogen.

Books and their Contents.

Books marked * have been presented by the Authors or Publishers, and may be seen in the Library of the Institute.

- “Animal and Vegetable Oils, Fats and Waxes: Their Manufacture, Refining and Analysis, including the Manufacture of Candles, Margarine and Butter.” Geoffrey Martin. Pp. x & 218. (London: Crosby, Lockwood & Son.) 12s. 6d. net.

Nature of animal and vegetable oils and fats; manufacture of animal oils and fats; recovery of oil from metal turnings (swarf) and waste rags, etc., in engineering shops; manufacture of fish oils, fish meal, and fish guano; manufacture of vegetable oils by pressing; manufacture of vegetable oils by extraction with solvents; the refining and deodorisation of animal and vegetable oils; the hardening of fats, the hydrogenation of fats; varieties of fats, fatty oils, and waxes; analysis of fatty oils; manufacture and analysis of butter; manufacture and analysis of margarine; manufacture of fatty acids and candles: appendices.

- “Basic Open Hearth Steel Process, The.” Carl Dichmann, translated by A. Reynolds. Pp. xii & 334. (London: Constable & Co., Ltd.) 12s. 6d. net.

Physical conditions; raw materials; reactions; thermal conditions and temperature of reaction; distillation and producer gas; chemistry of the basic open hearth process.

- “Chemical Fertilisers and Parasiticides.” S. H. Collins. Pp. xii & 273. (London: Bailliere, Tindall & Cox.) 10s. 6d. net.

Plant growth without fertilisers; the increase of crops by the use of fertilisers; mineral deposits: fuel by-products; industrial by-products; plant and animal refuse; atmospheric nitrogen; the manufacture of fertilisers; the use of fertilisers: the future of fertilisers: chemical insecticides and fungicides.

- * “Chemists’ Year Book, The.” Edited by F. W. Atack, M.Sc., assisted by L. Whinates. 2 vols. Pp. 1136. (London: Sherratt & Hughes.)

"Electric Furnaces in the Iron and Steel Industry." Eodenhauer, Schoenawa & Vom Baur. Pp. xxi & 460. (New York: John Wiley & Sons, Inc.) 21s. net.

Part I.: Electric furnaces, their theory, construction and criticism;
Part II.: (a) materials for furnace construction and cost of operation;
(b) the electro-metallurgy of iron and steel.

* "Food Inspection and Analysis." Albert E. Leach, revised and enlarged by Andrew L. Winton. 4th Edition. Pp. xix & 1090. (New York: John Wiley & Sons, Inc. London: Chapman & Hall, Ltd.) 45s. net.

Food analysis and official control; the laboratory and its equipment; food, its functions, proximate components and nutritive value; general analytical notes; the microscope in food analysis; the refractometer; milk and milk products; flesh foods; eggs; cereals and their products; legumes, vegetables, and fruits; tea, coffee, cocoa, spices; edible oils and fats; sugar and saccharine products; alcoholic beverages; vinegar; artificial food colours; food preservatives; artificial sweeteners; flavouring extracts and their substitutes; vegetable and fruit products; determination of acidity by means of the hydrogen electrode; photomicrographs of pure and adulterated foods and of adulterants.

"Identification of Organic Compounds, The." G. B. Neave and I. M. Heilbron. 2nd Edition. Pp. viii & 88. (London: Constable & Co., Ltd.) 4s. 6d. net.

Tests for the elements; group reactions; hydrocarbons; alcohols; ethers; phenols; aldehydes; ketones; acids and their anhydrides, halides, amides, imides and anilides; esters; quinones; carbohydrates; glucosides; amines; nitro and nitroso compounds; nitriles and isonitriles; isocyanates; ureas and ureides; azo compounds; heterocyclic compounds; alkaloids; sulphur compounds; terpenes; albumens.

"Introduction to General Chemistry." H. N. McCoy and E. M. Terry. Pp. 648. (London and New York: McGraw Hill Book Co., Inc.) 18s. net.

With the exception of two chapters dealing with the laws and theories of physical chemistry, the book is devoted to inorganic chemistry.

"Introduction to the Study of Fuel." F. J. Brislee. Pp. xxii & 269. (London: Constable & Co., Ltd.) 9s. 6d. net.

General principles; weight and volume of air for combustion; analysis of fuel and flue gases; calorimetry; pyrometry; calculation of combustion temperatures; nature of artificial solid fuels; gaseous fuel; producer gas; water gas; explosion; air supply; furnace efficiency and fuel economy; heat balances; liquid fuels; bibliography and five appendices.

“ Kinetic Theory of Gases and Liquids.” Kleeman. Pp. xvi & 272. (New York: John Wiley & Son, Inc.) 16s. 6d. net.

The molecular constituents, and the dynamical properties of a molecule in gaseous state; the effect of molecular force on the properties of a molecule in a dense gas or liquid; quantities which depend directly on the nature of molecular motion; applications, connections and extensions.

“ Laboratory Manual of Organic Chemistry.” H. L. Fisher. Pp. x & 331. (New York: John Wiley & Son, Inc.) 12s. 6d. net.

Part I.: Laboratory experiments; Part II.: Organic combustion; the determination of (a) carbon and hydrogen; (b) nitrogen.

“ Metallography.” S. L. Hoyt. Pp. x & 206. (New York: McGraw Hill Book Co., Inc.) 18s. net.

Constituent diagrams; preparation of metallic alloys; metallic microscopy; the micro-structure of metals and alloys; pyrometry and thermal analysis; physical and mechanical properties.

“ Notes on Chemical Research.” W. P. Dreaper. Pp. xv & 195. 2nd Edition. (London: J. & A. Churchill.) 7s. 6d.

Nature of scientific knowledge; historical; observation and experiment; preliminary survey and selection of subject-matter; methods of investigation; philosophy and experimental science; chemical research and industry; research in relation to analysis; aims of practical science; practical investigation and the personal factor; laboratory research and works practice; works organisation; efficiency; large-scale operations; the student and training; recording of results.

“ Ozone.” (Series of Treatises on Electro-Chemistry.) E. K. Rideal. Pp. ix & 198. (London: Constable & Co., Ltd.) 12s. net.

History and general properties; natural occurrences; chemical production; thermal production; electrolytic preparation; production by ultra-violet radiation and ionic collision; production by silent discharge; catalytic decomposition; industrial applications; detection and analysis.

- “ Practical Plant Bio-Chemistry.” Muriel W. Onslow. Pp. 178. (Cambridge University Press.) 15s. net.

The colloidal state; enzyme action; carbon assimilation; carbohydrates and their hydrolising enzymes; the fats and lipases; aromatic compounds and oxidising enzymes; the proteins and proteases; glucosides and glucoside-splitting enzymes; the plant bases.

- “ Problems in Physical Chemistry.” Edmund B. R. Prideaux. Pp. xii & 294. (London: Constable & Co., Ltd.) 18s. net.

Units and standards of measurement; thermochemistry; systems of one component; systems of two components; reactions in gases; reactions in solution; electro-motive forces and chemical reaction; velocity of chemical and radio-active changes.

- “ Public Health Laboratory Work (Chemistry).” H. R. Kenwood, C.M.G. Pp. xx & 420. (London: H. K. Lewis & Co., Ltd.) 15s. net.

The chemical, microscopical and physical examination of water, sewage and sewage effluents; soil examination; air analysis; food examination; examination of disinfectants.

- “ Solubilities of Inorganic and Organic Substances.” Atherton Seidell. 2nd Edition. Pp. xxii & 845. (London: Crosby, Lockwood & Son.) 45s. net.

Arranged alphabetically, with appendices and author and subject indexes.

- “ South Wales Coals: Their Analyses, Chemistry and Geology.” Llewellyn J. Davies. Pp. 89. (Cardiff: The Business Statistics Co., Ltd.) 10s. 6d. net.

- *“ Technical Handbook of Oils, Fats and Waxes.” Percival J. Fryer, F.I.C., and Frank E. Weston, B.Sc., F.I.C. 2 vols. 3rd Edition. (Cambridge University Press.) 25s. 6d. net.

Chemistry of the oils, fats and waxes; testing and analysis of oils, fats and waxes; classification of oils, fats and waxes; production and refinement of oils, fats and waxes; oleo-resins and essential oils. Introduction to practical work for technical students; sampling and preliminary tests; practical methods for the standard analytical determinations; specific tests for oils, fats and waxes; identification and determination of fatty acids and alcohols (including glycerin); testing and analysis of hydrocarbon oils and waxes; testing and analysis of rosin and turpentine; interpretation of results; scheme for the identification of an oil, fat, or wax; tables.

“Textbook of Gas Manufacture.” John Hornby. Pp. xi & 423. (London : C. Bell & Sons, Ltd.) 12s. net.

Properties and values of various coals ; carbonisation ; description and arrangement of apparatus ; labour-saving appliances ; purification ; instruments for ascertaining purity and illuminating power ; photometry ; pressure control ; gas consuming apparatus ; enrichment of coal gas ; manufacture of sulphate of ammonia.

“Textbook of Organic Chemistry, A.” E. de Barry Barnett. Pp. xii & 380. (London : J. & A. Churchill.) 15s. net.

Part I. : The aliphatic compounds ; Part. II. : the aromatic compounds, with chapters on nitroso and nitro compounds ; amino compounds ; sulphonic acids ; diazo compounds ; azoxy and hydrazo compounds ; anthraquinone ; triphenylmethane dyes ; alicyclic compounds ; heterocyclic compounds ; the purins and alkaloids, etc.

“Tungsten Ores.” Imperial Institute Monographs. R. H. Rastall and W. H. Wilcockson. Pp. ix & 81. (London : John Murray.) 3s. 6d. net.

Tungsten ores, their occurrence, characters and uses ; sources of supply references to literature.

Changes in the Register.

At the meetings of the Council held on April 23rd and May 28th, 1920, 11 new fellows were elected; 5 Associates were elected to the Fellowship; 57 Associates were elected; and 91 Students were admitted.

The Institute has lost 5 Fellows and 1 Associate by death.

S. = Naval, Military, or Air Service. M = Munitions. I.I. = Passed the Intermediate Examination of the Institute.

New Fellows (By Examination).

Clayton, Ellis, 7, Evington Road, Leicester.

Clewer, Hubert William Bentley, 13, Moyers Road, Leyton, London, E. 10.

Eames, Robert Owen, B.Sc. (Wales). 16, Richard Avenue, Fartown, Huddersfield.

Ratcliffe, Norman, 10, Plympton Avenue, Brondesbury, London, N.W. 6.

New Fellows.

Allmand, Arthur John, D.Sc. (Liv.), King's College, Strand, London, W.C. 2. [S.; Professor of Chemistry.]

Cooper, Evelyn Ashley, D.Sc., A.R.C.S. (Lond.), Lulworth, Highfield Avenue, Aldershot. [S.; Mentioned in Despatches; Chemist to Aldershot Command; Research.]

Gauge, Arthur Josiah Hoffmeister, 31, Hedge Lane, Palmers Green, London, N. 13. [Government Laboratory; Research.]

Gidden, William Thomas, A.C.G.I., Woodside, Abbey Road, Smethwick, nr. Birmingham. [Senior Research Chemist, Chance & Hunt, Ltd., Publications; Inventions.]

Holroyd, George William Fraser, M.A. (Oxon.), Municipal Technical School, Blackburn, Lanes. [S.; Acting Principal, Blackburn Tech. School; Research; Publications.]

Lampitt, Leslie Herbert, D.Sc. (Birm.), 33, Roxborough Park, Harrow-on-the-Hill, Middlesex. [S.; Head of Biochemical Research Dept., Messrs. J. Lyons & Co., Ltd.]

Myers, John, 23, Dewsland Park Road, Newport, Mon. [Chief Metallurgical Assistant to G. Rudd Thompson, F.I.C.; Over 20 years' experience.]

Associates Elected to Fellowship.

- Barnett, Edward de Barry, B.Sc. (Lond.), 9, Collingham Road, South Kensington, London, S.W. 5.
 Georgi, Charles Denis Victor, O.B.E., B.Sc. (Lond.), Elm Lodge, Golders Green Road, London, N.W. 4.
 Mardles, Ernest Walter John, M.Sc. (Lond.), 24, R.F.C. Villas, Lynchford Road, S. Farnborough, Hants.
 Shankster, Harry, 138, Elgin Road, Seven Kings, Essex.
 Zilva, Sylvester Solomon, Ph.D. (Giessen), D.Sc. (Lond.), Lister Institute of Preventive Medicine, Chelsea Bridge Road, London, S.W. 1.

New Associates (By Examination).

- Appleyard, Frederick Norman, 12, Cartwright Gardens, London, W.C. 1.
 Bowman, Stanley, 26, Ewart Road, Chatham.
 Humphries, Ronald, 51, Gordon Road, Monton, Manchester.
 Lees, Arnold, c/o County Laboratory, 36, Dansie Street, Liverpool.
 Phillips, Sydney Bertram, 8, Milford Road, Harborne, Birmingham.
 Pickering, Eric Charles, B.Sc. (Lond.), 35, Alexandra Avenue, Mansfield, Notts.

New Associates.

- Akehurst, Charles Henry, B.Sc. (Lond.), Ash Grove, Runtlings Lane, Ossett, Yorks. [S.]
 Allen, Frank Laurence, B.Sc. (Lond.), 300, Central Park Road, East Ham, London, E. 6. [Research.]
 Allibone, Bernard Charles, A.R.C.S. (Lond.), Chevet Lane, Sandal, Wakefield. [S.; Research.]
 Anderson, Duncan Geddes, c/o Maclay, 990, Pollokshaws Road, Crossmyloof, Glasgow. [Glasgow Univ.; Research; Patents.]
 Asherson, Nehemiah, M.A. (Cape), Rosemount, 7, Exeter Road, Brondesbury, London, N.W. 2. [Demonstrator.]
 Aspland, Alfred Lees, B.Sc. (Vict.), c/o Mrs. Chandler, Leire, Lutterworth. [M.; over 12 years' experience.]
 Bacharach, Alfred Louis, B.A. (Cantab.), Glaxo Research Laboratory, 42a, Bravington Road, Harrow Road, London, W. 9. [Works Chemist; Research.]
 Berry, Walter Richard, B.Sc. (Manc.), 128, High Street, Chorlton-on-Medlock, Manchester. [M.; S.; Research.]
 Bullen, John James Curno, 30, Robertson Street, Greenock. [Finsbury Technical College; over 13 years' experience.]
 Burns, Alan Chamley, B.Sc. Tech. (Manc.), Dyestuffs Research Laboratory, College of Technology, Manchester. [S.]

- Chalmers, Frederick Grant Duncan, M.A., B.Sc. (Aberd.), 20, Birchfield Road, Six Ways, Birmingham. [S. ; M.]
- Chapman, Arthur William, A.R.C.S., B.Sc. (Lond.), Y.M.C.A. Settlement, Oxford Street, Sheffield. [M.]
- Chibnall, Albert Charles, M.A. (Cantab.), Cedar House, Chiswick Mall, London, W. 4. [S.]
- Dawn, Thomas Sydney, A.R.C.S. (Lond.), 21, Belsize Square, London, N.W. 3. [S. ; M.]
- Dent, James Harry, 21, Murray Street, Burnley, Lanes. [Burnley Mun-Tech. Inst. ; M. ; over 12 years' experience.]
- Downes, Edgar Stanley, c o Messrs. Meggitts (1917), Ltd., Sutton-in-Ashfield, Notts. [S. ; over 7 years' experience.]
- Ellis, George Holland, A.M.C.T., 19, Millwain Road, Levenshulme, Manchester. [S. ; Research.]
- Eustice, Miss Lovelyn Elaine, B.Sc. (Lond.), Royal Naval College, Greenwich, London, S.E. 10. [M. ; Research.]
- Fowler, Russell Aubrey, B.Sc. (Adelaide), 61, Rookwood Street, Mount Lawley, Western Australia. [S. ; Research ; Inventions.]
- Fox, Norman Taylor, 72, The Rand, Eastriggs, Dumfriesshire. [Royal Tech. Inst. ; Salford ; Coll. of Technology, Manchester ; S. ; M. ; 10 years' experience.]
- Gent, Charles Rochester, B.Sc. (Dun.), 74, Addison Road, Heaton, Newcastle-on-Tyne. [S. ; Research.]
- Grindle, William George, M.Sc. (Leeds), 27, Grove Road, Clapham Park, London, S.W. 12. [S. ; Govt. Lab.]
- Hamer, John Davies, 260, Cross Flatts Grove, Leeds. [Over 15 years' experience ; Publications ; Patents.]
- Hird, Harold Pearson, Moor End, Dewsbury Moor, Dewsbury, Yorks. [Bradford Tech. Coll. ; Patents.]
- Hocking, Frederick Denison Maurice, 18, Woodside Park Road, North Finchley, London, N. 12. [Finsbury Tech. Coll. ; S.]
- Houssa, Armand Henri Joseph, B.Sc. (Lond.), 11, Tremadoc Road, Clapham, London, S.W. 4. [S.]
- Hunt, Sydney Walter, B.Sc., A.R.C.S. (Lond.), 21, Hillsboro' Road, East Dulwich, London, S.E. 22. [Works Chemist.]
- Jones, Harold Bramfield, B.Sc. (Lond.), Broadway House, Northolme Road, Highbury, London, N. 5. [Govt. Lab.]
- Jones, John Pryce, B.Sc. (Wales), Brynhyfryd, Pencader, Wales. [S. ; M.]
- Laiwala, Kumudechandra Ghelabhai, M.A., B.Sc. (Bombay), c o Messrs. Thomas Cook & Son, Ludgate Circus, London, E.C. 4. [Bombay University, Indian Institute of Science ; Battersea Polytechnic ; Thesis.]
- Lander, Percy Edward, D.Sc. (Lond.), M.A. (Cantab.), 37, Queen's Gate Gardens, South Kensington, London, S.W. 7. [S. ; Mentioned in Despatches.]

- Lee, Harry Lancelot, 10, Hawthorn Terrace, New Earswick, York. [School of Pharmaceutical Soc. ; Leeds Univ. ; over 18 years' experience.]
- Lerrigo, Arthur Frank, B.Sc. (Birm.), 3, St. Peter's Gardens, Muswell Hill, London, N. 10. [S. ; Govt. Lab.]
- Main, Thomas Lightfoot, B.Sc. (Dun.), 69, Hazelwood Avenue, West Jesmond, Newcastle-on-Tyne. [S. ; M.]
- Marsh, Ernest Victor, B.Sc. (Liv.), 10, Woodland Road, Derby. [S.]
- Martin, William George, A.C.G.F.C., 31, Queen's Avenue, Blackhall, Midlothian. [Works Chemist ; Publications.]
- McEntegart, James Mathews, M.Sc. (Liv.), 36B, Longridge Road, Earl's Court Road, London, S.W. 5. [S. ; Research ; M.]
- Orr, Thomas Workman, c/o William Orr, Esq., 15, Oakfield Terrace, Hillhead, Glasgow. [Royal Tech. Coll., Glasgow ; over 18 years' works experience.]
- Paterson, Alexander Gustave Clive, The Pastures, Spondon, nr. Derby. [School of Pharmaceutical Soc. ; Birkbeck College and King's College, London ; 17 years' experience ; Research ; Publications.]
- Pugh, Frank Henry, B.A. (Cantab.), Keizersgracht 774, Amsterdam, Holland. [S.]
- Rawson, Valentin Stratford, B.Sc. (Brisbane), c/o C. Rawson, Esq., F.I.C., 22, Cumberland Street, Manchester. [Over 10 years' experience.]
- Regan, William, junr., B.Sc. (Glas.), A.R.T.C., Braemar, Adele Street, Motherwell, Lanarkshire. [Works Chemist and Metallurgist.]
- Scanlan, John Joseph, junr., A.R.C.S.I., 29, Ailesbury Road, Dublin. [Research.]
- Slater, Frank, O.B.E., B.Sc. (Vict.), Chemistry Dept., Mining and Technica College, Wigan. [Works Chemist.]
- Stafford, William, M.Sc. (Vict.), Rookwood, Bridge of Weir, Scotland. [M. ; 7 years' experience ; Research.]
- Tesh, William, M.A., B.Sc. (Oxon), 43, Leeds Old Road, Thornbury, Bradford, Yorks. [S. ; Research.]
- Thomas, Francis Edwyn, M.A. (Oxon), 9, Hart Grove, Ealing Common, London, W. [S. ; Works Chemist.]
- Thornton, Edwin, B.Sc. (Leeds), 9, Heol-y-Nant, Clydach S.O., Glam. [S. ; M.]
- Tunstall-Behrens, Mrs. Gwen, Porth-en-alls, Marazion, R.S.O., Cornwall, [Nat. Sci. Tripos., Cambridge ; I.I. ; Publications.]
- White, George Frederic, B.Sc. (Lond.), 4, Eversleigh Road, East Ham, London, E. 6. [M.]
- Woodhead, Miss Gertrude Ramsden, B.Sc. (Leeds), Sneaton Castle, Whitby, Yorkshire. [8 years' Works and Teaching experience.]

New Students.

- Anderson, William Richardson, 3, Derwentwater Terrace, S. Shields.
- Andrew, Alexander, 26a, Waterside, Irvine, Ayrshire.

- Arundale, Leslie, 92, Slade Lane, Longsight, Manchester.
 Baines, Harry, 22, Henry Road, West Bridgford, Notts.
 Barron, Richard James, Glen Cottage, Waterford, Ireland.
 Benson, Edward James, 2, Kemble Street, Prescott, Lancs.
 Bevan, Robert Grey, Llantivit House, Stanley Terrace, Aberystwyth.
 Branson, Victor Cecil, 97, Woodwarde Road, E. Dulwich, London, S.E. 22.
 Brown, John, 38, Findhorn Place, Edinburgh.
 Browne, Gerald Barton, 11, Northwick House, St. John's Wood Road, London, N.W. 3.
 Bryett, William Henry, 36, Dore Avenue, Manor Park, London, E. 12.
 Burns, Robert, 49, Kilmahew Street, Ardrossan, Scotland.
 Caminsky, Abraham, Magadi Soda Works, Lake Magadi, British East Africa.
 Challis, William, 130, Ayres Road, Old Trafford, Manchester.
 Chapman, William Ronald, 323, Granville Road, Sheffield.
 Chater, Trevor Walter James, 9, Norman Terrace, Street Lane, Roundhay, Leeds.
 Cleland, David Picken, 38, Viewpark Drive, Rutherglen, Glasgow.
 Cooper, James Drummond, 2, Marchhall Crescent, Edinburgh.
 Cross, Alfred Ernest, 22, Ryland Street, Stratford-on-Avon.
 Curran, Hugh, 13, Mayor's Walk, Waterford, Ireland.
 Derrick, William, 101, Forester Road, Thorneywood, Nottingham.
 Downing, Leonard Alfred, 17, Carholme Road, Forest Hill, London, S.E. 23.
 Ecob, William Alfred, Tenedos, Cropwell, Radcliffe-on-Trent, Notts.
 Evans, Harold Arthur, 47, Victoria Road, Woolston, Hants.
 Fairgrieve, Miss Jessie Helen Carroll Dick, North Middleton, Gorebridge, Midlothian, Scotland.
 Fraser, James Everard, 5, Stanley Street, Portobello, Edinburgh.
 Freeman, Percy Arthur Reginald, 114, Laburnum Grove, North End, Portsmouth.
 Fritz, Jack, 5, Rugby Mount, Meanwood Road, Leeds.
 Gallie, George, County Buildings, Haddington, Scotland.
 Gentle, Joseph Alfred Hector Roberts, 21, Owenite Street, Abbey Wood, London, S.E. 2.
 George, Cyril Henry, 9, Hanover Street, Rye Lane, Peckham, London, S.E. 15.
 Goldstein, Jacob, 39, Montague Street, Edinburgh.
 Goodale, Arthur Albert, 45, Bective Road, Putney, London, S.W. 15.
 Grant, James, 25, Dundas Street, Edinburgh.
 Green, Brian Michael, 26, Upper Hamilton Terrace, London, N.W. 8.
 Groves, Adam Traill, 12, James Place, Leith.
 Halton, Philip, 72, Elmhurst Road, Reading.
 Hartfall, Stanley Jack, 13, Springfield Mount, Leeds.
 Harvey, Cecil Owen, 5, Park Hill Road, Chingford, London, E. 4.
 Haworth, Thomas, 10, Frederick Street, Oswaldtwistle, Lancashire.

- Heppell, Walter, 77, Central Avenue, New Basford, Nottingham.
- Hickman, Alan, 15, Albert Road, Tamworth, Staffs.
- Hodgkiss, Frank Livsey, 274, Plodden Lane, Farnworth, nr. Bolton.
- Hudson, Ronald William Austen, 8, Elibank Road, Eltham, London, S.E. 9.
- Jackman, Douglas Norman, 18, West Side, Clapham Common, London, S.W. 4.
- Jenkin, John Watson, 31, Red Lion Road, Tolworth, Surbiton, Surrey.
- Johnson, Rowland Nicholas, Greenstede, West Hill, East Grinstead, Sussex.
- Kay, Leonard James, 42, Wilson Street, Poplar, London, E. 14.
- Laing, William Mossman, 22, Eastfield, Joppa, Edinburgh.
- Langsdale, Donald Abbott, 51, Sandon Street, New Basford, Nottingham.
- Lindemann, Christel Ferdinand, Government Chemical Laboratories, P.O. Box 1080, Johannesburg, S. Africa.
- Linstead, Reginald Patrick, 46, Compton Road, Winchmore Hill, London, N. 21.
- Lochhead, George Robb, 2, Glenview, Paisley, Scotland.
- Lock, Ritchie Hart, The Artists' Rifles H.Q., Duke's Road, Euston Road, London, W.C. 1.
- Lomax, James, 25, Devonshire Road, Eccles, Lancs.
- MacGregor, Miss Marjory Lamont, 20, Denham Green Terrace, Trinity, Edinburgh.
- Mackley, Fred, Derby Road, Ponders End, Middlesex.
- Mascull, George Joseph, 42, Vestris Road, Forest Hill, London, S.E. 23.
- Matthews, Robert Karran, 24, Grasville Road, Higher Tranmere, Birkenhead.
- McGregor, Ernest, 4, West Savile Terrace, Edinburgh.
- McGregor, Percy, 4, West Savile Terrace, Edinburgh.
- Miller, Miss Christina Cruickshank, 7, Douglas Street, Kirkcaldy.
- Mitchell, Michael George, 1, Iona Crescent, Glasnevin, Dublin.
- Moncrieff, William, 15, Restalrig Terrace, Leith.
- Mumford, Stanley Augustus, Runnymede, 11, Wellington Road, Enfield, Middlesex.
- Murchison, Norman, 46, Brunswick Street, Edinburgh.
- Norris, Woodford Stanley Gowan Plucknette, Bedford House, 42, Linton Road, Barking, Essex.
- Oliver, Miss Jane Wilson, 6, Park Road, Leith.
- Peard, George Thomas, Heyes House, Rainhill, Lancs.
- Pearson, Miss Margaret, 16, Clanricarde Gardens, London, W. 2.
- Pugh, William, 23, Allerton Road, Stoke Newington, London, N. 16.
- Revis, Frank Leonard Bingham, 7, Kitson Road, Barnes, London, S.W. 13.
- Richards, Thomas, 33, Norris Street, Darwen, Lancs.
- Rogers, Harold Belton, 80, Crawford Avenue, Sefton Park, Liverpool.
- Roper, Edwin Claxton, The Pines, Red Hill, nr. Birstall, Leicester.
- Russell, Miss Doris Helen, 16, Clanricarde Gardens, London, W. 2.
- Smith, Gavin Hamilton, Ardfein, Falkirk.

Smith, James, 8, Church Street, Rastrick, Brighouse, W. Yorks.
 Stoye, Francis Wilbert, 37, Kansas Avenue, Belfast, Ireland.
 Swanney, John William, 7, Jessfield Terrace, Leith.
 Walker, Thomas Henry, Porterswell, Uddingston, nr. Glasgow.
 Wall, Thomas John, Oakworth Villa, St. Andrew's Road, Malvern.
 Ward, Charles Frederick, 17, High Street, Old Basford, Nottingham.
 Whipp, James Ewart, 15, St. John Street, Longsight, Manchester.
 White, Charles Bertram, 7, Bellevue Gardens, Kemp Town, Brighton.
 Whiting, William Henry, 13, Manvers Street, Bath.
 Wilkie, Alexander Stewart, 39, Aglionby Street, Carlisle.
 Wilshire, Laurence Arthur, 69, Maury Road, Stoke Newington, London,
 N. 16.
 Woosley, Duncan Pax, 96, Roxborough Road, Harrow, Middlesex.
 Wyman, Miss May Elizabeth, 63, Stroud Green Road, Finsbury Park,
 London, N. 4.
 Yarker, George Herbert, Fulbeck, Grantham, Lincs.

DEATHS.

Fellows.

Grossman, Jacob, M.A., Ph.D. (Heid.).
 McAlley, Robert.
 Messel, Rudolph, Ph.D. (Tübingen), F.R.S.
 O'Shea, Lucius Trant, M.Sc. (Lond.).
 Smith, Watson.

Associate.

Boswell, Arnold, B.A. (Cantab.).

Alterations for the Register.—To the entry of the name of Edwin Williams (Associate), add "Lieut., 16th Batt. 16th Welsh (Cardiff City) Battalion." Miss K. M. B. Hutchins, Registered Student, on her marriage, — Mrs. Aylward.

General Notices.

Examinations.—An Examination in Biological Chemistry and Bacteriology, Fermentation and Enzyme Action, will be held in October, 1920. Intending candidates can obtain full particulars from the Registrar.

Notice to Associates.—Associates elected prior to June, 1917, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain forms of application for election to the Fellowship.

Appointments Register.—A Register of Fellows and Associates of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

The Library.—The Library is open for the use of Fellows, Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays: 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is also available for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 A.M. to 9 P.M. on week-days; (Saturdays from 10 A.M. to 5 P.M.).

The Institute has been notified that the Library of the Society will be closed for stocktaking from Monday, August 9th, until Saturday, August 21st, 1920, inclusively.

Changes of Address.—In view of the expense involved through frequent alterations of addressograph plates, &c., Fellows, Associates, and Students notifying changes of address are requested, as far as possible, to give their *permanent* addresses for registration.

INSTITUTE OF CHEMISTRY.

PUBLICATIONS.

- Register of Fellows, Associates and Students.** 5s.
Regulations for the Admission of Students, Associates and Fellows. *Gratis.*
Examination Papers: Annual Sets, *One Shilling*, Post free.
Journal and Proceedings, Six Parts Annually. *Each Part, Two Shillings.* (Post free 2s. 1d.)
History of the Institute: 1877-1914, 15s.; Special Edition, £2 2s.

LECTURES.

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THE
INSTITUTE OF CHEMISTRY
OF
GREAT BRITAIN AND IRELAND.

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INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.
1920.

PART IV.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER,
Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.
August, 1920.

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Editorial.

IN the autumn of last year the Council, acting upon a suggestion from the London Section, invited members in whole-time appointments to give particulars of the salaries and conditions attached thereto. Statistics compiled from the replies were published in Part I. of the Journal of this year.

The Council have good reason to believe that the publication of these statistics has had beneficial effects in several ways. The figures enabled members to learn whether their salaries were comparable with the general average which chemists of similar age and standing were receiving throughout the profession. Accordingly those members who were in receipt of remuneration inferior to the average were in many cases constrained to take steps to improve their positions, either by approaching their employers or by making use of the Appointments Register to seek new appointments carrying better salaries or otherwise improved conditions of employment. At the same time the Council were placed in possession of facts which enabled them to point out to Government Departments and other employers of chemists that it was imperative to revise the conditions attached to appointments which became vacant, especially as it became clear from the state of the Appointments Register that suitable candidates would not be attracted if the salaries offered were less than the average prevailing in the profession for chemists with the length of experience required.

The figures have, moreover, served as a useful guide to chemists taking up their first appointments, and have assisted the Registrar in advising firms who were engaging the services of chemists for the first time.

The Council believe that the general position has improved considerably since these statistics were compiled,

and in order that up-to-date information may be obtained, they have instructed the Registrar to invite members to make a new return. A form for the purpose is enclosed with this Part of the Journal, and every member occupying a whole-time appointment is urged to fill it up and return it to the Registrar as soon as possible. The Council hope with the particulars derived from the returns, to be able to keep the members informed, in their own interest, of the conditions of employment throughout the profession.

On the previous occasion, less than a thousand members replied to the circular letter, and it is probable that these did not comprise more than 50% of the members in whole-time appointments. It is hoped that members who did not reply last year will now realise that it is only by the co-operation of all Fellows and Associates of the Institute that the Council can assist on these lines in taking steps to improve the status of the profession. The information contained in the replies will be regarded as confidential and will be used only for the compilation of the statistics. The form need not be signed, and it may, if desired, be typewritten.

Proceedings of the Council.

(June—July, 1920.)

Revision of the By-laws of the Institute.—The Council hope to be in a position to call an Extraordinary General Meeting of the Institute in the autumn to consider and adopt the revised By-laws.

Fellows and Associates will recollect that the main object of the revision was the alteration of the method of electing the Council. When the work was taken in hand, however, it was found advisable to make a thorough overhaul of the By-laws, which had not been changed in any respect since 1893. The By-laws were revised in consultation with the legal advisers of the Institute, and copies were then forwarded to the Local Sections and to Honorary Corresponding Secretaries in the Overseas Dominions and in India. Upon careful consideration of the suggestions received, further revision ensued, and the final draft has now been submitted to the Privy Council, whose approval is required under the Charter before the new By-laws can be adopted.

The alterations made in the method of electing the Council have led to extensive changes in Chapters headed “ II.—General Meetings,” “ III.—Votes of Members,” and “ IV.—The Council and Officers.”

In future the Council is to consist of at least 45 members, including 10 District Members, and the balloting list will allow a choice of candidates to those who exercise their vote; hence new arrangements will have to be made for the election of District Members, for the nomination of General Members, and for regulating the appointment and duties of the Scrutineers.

Other chapters referring to the proceedings of the Council, control of finances, admission of Fellows, Associates and Students, and examinations, have been amplified where necessary to meet present conditions.

Chapter IX., relating to the Censors and their duties, has received special consideration, having regard to the importance of maintaining the standard of professional procedure of practitioners in chemistry on a basis similar to that obtaining in medicine and the law. The difficult and responsible nature of the duties entrusted to the Censors is such that election to office as a Censor is regarded as almost the highest honour the members can bestow on a Fellow. The new By-laws, therefore, will provide for election by postal vote instead of, as hitherto, for election by those members only who attend the Annual General Meeting. The deliberations of the Council, General Purposes Committee and a Special Sub-Committee were directed to the interpretation of the provisions of Clause (3) of Section 16 of the Charter, under which a member is liable to exclusion or suspension from membership if he "is held by the Council on the complaint of any member of the Institute or of any person aggrieved to have been guilty of any act or default discreditable to the Profession of Analytical and Consulting Chemist." In the course of the discussion the question arose whether the new By-laws should incorporate the Resolution passed by the Institute in General Meeting held on April 27th, 1893, which was as follows :—

"That the following acts, or any of them, shall be held to be 'discreditable to the profession of Analytical and Consulting Chemist,' viz. :—

- (a) Advertising for practice in newspapers, journals, magazines, or other published papers.
- (b) Sending out by post, or otherwise, letters, circulars, or cards offering professional services.
- (c) Undertaking through another person or agency the performance of professional work at fees representing only a small fraction of the usual recognised scale of fees for analytical work.
- (d) Supplying to other persons, not being qualified chemists, reports upon samples or processes with the knowledge that these other persons will issue such reports as their own work.

- (e) Issuing or allowing to be issued certificates of purity or superiority concerning advertised commodities, such certificates being either not based upon the results of an analysis, or containing exaggerated, irrelevant, or merely laudatory expressions, designed to serve the purposes of a trade puff.
- (f) The unauthorised use of letters indicating University degrees."

The above resolution if rigidly interpreted by the Censors might not in every instance be easily enforced, and, on the other hand, it has an appearance of finality without in reality being exhaustive. The circumstances in each case of complaint require very careful investigation, and, moreover, while the resolution indicates that certain acts are regarded as discreditable, the Council and Committees agreed that the Censors should be allowed unfettered discretion in dealing with complaints.

Although the number of cases requiring the attention of the Censors has always been small, the Council felt that some such guidance as that afforded by the resolution was desirable, since every member should be made aware of the obligations mutually imposed upon all Fellows and Associates in the conduct of their professional work, and any regulation would obviously carry greater authority in the form of a By-law, to which every member subscribes on admission, than of a resolution passed in general meeting. A by-law embodying a schedule of discreditable acts could not be exhaustive, but it should have a deterrent effect in relation to such offences as soliciting for practice ; " undercutting " the fees commonly charged for analysis, investigations and advice ; " trade puffs " for commodities ; bolstering up manufacturing processes, and similar undignified conduct.

The principles on which codes of professional conduct are based are to be found in the sense of Fellowship which professional bodies endeavour to maintain among their members. Professional men, therefore, in accepting the obligations of membership, are bound to avoid taking any unfair advantage of their fellow practitioners and to uphold the dignity and welfare of their calling by conducting their

practices with the strictest integrity in all relations with the public.

A new By-law has therefore been framed in the following terms :—

The following Acts are such as shall be deemed to be discreditable within the meaning of Section 16 (3) of the Charter :—

- (a) Unprofessional soliciting for practice.
- (b) Unfair competition.
- (c) Supplying to other persons not being qualified chemists, reports or certificates with the knowledge that these persons will issue such reports or certificates as their own work.
- (d) Issuing or allowing to be issued reports or certificates intended for publication containing unjustifiable statements.

Provided that the above enumeration of Acts shall not be treated as exhaustive or in any manner limiting the interpretation of Section 16(3) of the Charter.

Other new By-laws relate to the formation and work of the Local Sections, which are thereby confirmed as part of the officially recognised constitution of the Institute.

The Cost of Printing.—The attention of the Council of the Institute has been drawn to a letter addressed by Sir Richard Glazebrook, President of the Institute of Physics, to the Conjoint Board of Scientific Societies, urging the necessity of taking steps to meet the grave difficulties confronting scientific societies on account of the present high cost of printing. The majority of the societies having been established not for purposes of gain, but for the benefit of their members and the advancement of science for the public good, few were able to show, even in pre-war times, any substantial balance of income over expenditure ; now, they are either faced with serious deficits, or are forced to seek for sources of further income, or to reduce the output of their publications, or to limit their activities in other directions.

Sir Richard Glazebrook has suggested that an appeal for funds from public sources might be made through the Department of Scientific and Industrial Research, and the Conjoint Board has been asked to approach the Prime Minister or the Chancellor of the Exchequer on the matter.

The Council expressed their desire to support this suggestion ; but, in the meantime, the Finance and Publications Committees of the Institute had investigated the cost of printing its Journal, and, having obtained estimates from a number of firms, found that a considerable saving could be effected by a change of printers. This part is the first to be entrusted to the firm selected.

In view of the heavy expense involved in the revision of the By-laws, the Council, acting on the advice of the Finance Committee, have decided not to reprint the Register this year.

Benevolent Fund Committee.—The institution of a Benevolent Fund as a War Memorial appears to have met with general approval. The Committee for the administration of the Fund report that on the 23rd August a sum of £246 stood to the credit of this account.

Fellows and Associates who have not already responded to the appeal are reminded that contributions can be forwarded at any time to the Hon. Treasurer or to the Registrar, and will be gratefully acknowledged. Although the need for the fund may not be found to be urgent at present, there is reason to anticipate that it may be required to meet difficulties in the future, when considerable numbers of ex-service students now in training are likely to need temporary help pending their settlement in civil life. The Institute, with its Appointments Register and Benevolent Fund, should be able materially to assist all ex-service chemists to secure appointments ; but it must look to the co-operation of Fellows and Associates in that connection, having regard to the fact that the general position of the profession is best safeguarded by ensuring the continuous satisfactory employment of its members.

In order to assist in the assimilation into industry of such chemists, the Council have authorised the Registrar to admit to the full privileges of the Appointments Register any

registered student in the last term of his college training whose application for such admission is endorsed by the Professors under whom he is working.

Royal Technical College, Glasgow.—The Council have decided that candidates who obtain the Associateship of the Royal Technical College, Glasgow, in Metallurgy, after a four years' course, including chemistry, physics and mathematics, shall be regarded under the Regulations of the Institute as on the same basis as those who obtain the Diploma in Chemistry, and shall be entitled to apply for admission to the Associateship of the Institute, provided they take additional courses in Organic and Physical Chemistry, agreed upon between the Council of the Institute and the Professors of the College, and pass the class examinations in all the required subjects.

The Chemistry Board of the College has decided that candidates for the Diploma of A.R.T.C. in Chemistry and in Metallurgy shall be required to pass an examination in French and German translation, without the aid of dictionaries.

City and Guilds Technical College, Finsbury.—The Council of the Institute have learned with regret of the decision of the authorities of the City and Guilds of London Institute to close the Finsbury Technical College. Many Fellows and Associates of the Institute of Chemistry who received their training at Finsbury are deeply concerned at the prospect of their College being closed, and hope that means may yet be devised for its continuance. The authorities have undertaken, in the meantime, to endeavour to make arrangements for those students who have not finished their courses by July, 1921, to complete them elsewhere. A number of Registered Students of the Institute who are preparing for the Associateship are affected. The Council of the Institute are anxious to afford these students, in their somewhat uncertain position, every possible assistance, and, in the present emergency, have offered the use of the rooms of the Institute for any meeting of past and present students of the College.

Register of Chemical Assistants.—The Institute has a register of chemical assistants who have matriculated and have passed or are preparing for an Intermediate or First Year Science examination. These youths are desirous of qualifying as Associates of the Institute, but their circumstances do not allow of their taking systematic day courses. Members are asked to co-operate with the Institute in finding suitable vacancies for such assistants, bearing in mind the importance of making arrangements for them to supplement their experience by day or evening classes.

It is obvious that the pay of such assistants should be at least sufficient to cover the expenses of their luncheons, clothes, and travelling, and to enable them to keep themselves or contribute in some measure to their maintenance at home. It is regrettable that some employers appear to hold that youths who can be of real assistance in many laboratory operations should be prepared to give their services at 12s. or 15s. per week. It should be recognised that the conditions applying in such cases before the war cannot now be regarded as reasonable since the parents of such youths are very rarely able to bear the whole cost of their maintenance.

Training of Chemical Assistants.—In pursuance of the policy outlined in the last number of the Journal, the Council have instructed the Registrar to write in the following terms to the chief chemists of firms employing chemical assistants:—

August 10th, 1920.

DEAR SIR,—

Chemical Assistants and Apprentices.

The Council of the Institute are considering the general question of the training and employment of chemical assistants, particularly having in view the desirability of arranging that assistants of proved merit, who undergo systematic training, shall have the opportunity of advancing from grade to grade until they are eventually fully qualified members of the profession of chemistry.

I would add that, in order to avoid a "blind-alley" occupation, the Council consider it desirable that such assistants should, in the first place, pass a preliminary examination in subjects of general education, such as would allow them to be registered as Students of the Institute in accordance with the enclosed Regulations; further, that those

students who do not avail themselves of the facilities which may be provided for systematic training in chemistry and cognate subjects, should be dissuaded from pursuing chemistry, and transferred to other vocations.

In view of the above considerations, and in order to assist them in framing a scheme of training, the Council have directed me to ask you if you will be so good as to inform them what arrangements your company have made to encourage the adequate training of any chemical assistants in your employment, by day or evening classes, at Universities or Technical Colleges.

I shall be greatly obliged if you will let me have a reply at your convenience.—Yours faithfully,

(Signed)

G. S. W. MARLOW,

Assistant Secretary : for Registrar and Secretary.

A number of replies have already been received indicating that firms are in sympathy with the views of the Council and have already made arrangements for the higher education of their chemical assistants. It is hoped that all chief chemists will assist the Council by making an early reply.

Examinations.—The Council have received the Report from the Board of Examiners on Examinations held during July (see p. 250). The Board have observed that in the majority of cases the candidates who have presented themselves for recent examinations have obtained good experience in the practical work of the branches selected. The Board feel, however, that many of the candidates do not appear to realise that the oral examination in general chemistry is an essential part of the examination in which they are expected to acquit themselves well.

Milk-Testing.—The Council have had before them a copy of an agenda of a recent meeting of a County Council, at which it was resolved that the Medical Officer of Health for the County be empowered to obtain a set of milk-and-fat testing hydrometers for the use of inspectors under the Sale of Food and Drugs Acts. It was proposed that the inspectors should make a rough testing of informal milk samples with a view to taking subsequently, formal samples from vendors

whose informal samples were found to be unsatisfactory by the hydrometer test—only such official samples being submitted to the public analyst.

The Council addressed a letter to the County Council expressing the opinion that the arrangement was likely to lead to waste of time and money on such testing, which was of little use by itself and liable to be misleading, since the mere determination of the specific gravity of the milk might allow many badly adulterated samples to be overlooked, while it was easy to sophisticate milk to pass the test satisfactorily. It had been found in practice, moreover, that when informal samples were taken, the suspicions of the vendors were for the time aroused, and the formal official samples taken subsequently proved almost invariably genuine. The Council of the Institute reminded the County Council that the Ministry of Health required high qualifications on the part of public analysts, adding that it was undesirable in the public interest and outside the provisions of the Acts, to entrust their work to unqualified and untrained persons. A copy of the correspondence was transmitted to the Ministry of Health.

Appointments Register.—Members have occasionally expressed a doubt whether their use of the Appointments Register when they are actually in employment is fair to the Institute and to their fellow chemists. It cannot be too strongly urged that such a use of the Register is not only justifiable, but is desirable, when the conditions attached to the employment are in any way unsatisfactory. This procedure affords one of the best means of impressing upon employers that they cannot obtain or retain the services of highly qualified men unless the conditions are satisfactory.

By proceeding to more satisfactory appointments members not only improve their own positions, but they leave vacancies which may be more suitable for younger chemists; the Institute is better able to exert its influence to improve the conditions when a new appointment is being made than to obtain direct redress for a dissatisfied member.

Lectures.—The Council regret that, owing to unforeseen circumstances, the arrangements made for the delivery of lectures before the Institute during the last session were eventually cancelled ; they hope, however, to continue the scheme in the near future.

Gas Regulation Bill.—The Legal and Parliamentary Committee has had under consideration the Gas Regulation Bill, to amend the Law with respect to the supply of gas. Clause 4 of the Bill, which has now been enacted, provides for the appointment by the Board of Trade of two gas referees and a chief gas examiner. Further, the Clause provides that the gas referees and the chief gas examiner may, with the consent of the Board, appoint such assistants as may be necessary for the proper discharge of their duties, and gives power to local authorities, unless they are themselves the undertakers, to appoint competent and impartial persons to be gas examiners, who, subject to the prescription of the gas referees, are to test the gas and the pressure at which it is supplied, provided that such gas examiners may be appointed to act on behalf of any number of local authorities, who may enter into such arrangement as they think fit in regard to the joint employment of such gas examiners. Any County Council may, if they think fit, with the consent of any other local authority within the county, appoint a gas examiner, who shall have the same powers as if he were appointed by that local authority. Section (4) of Clause 4 also provides that “where no gas examiner is appointed by the local authority, or where the testing of gas is imperfectly attended to, two justices, on the application of not less than five consumers, may appoint a competent and impartial person to act as gas examiner, who shall have the same powers and perform the same duties as if he were appointed by the local authority.” Under Clauses following the gas referees are required to prescribe tests, and the apparatus and method to be employed ; considerable powers are conferred on the gas referees and the gas examiners ; penalties are imposed on the failure of undertakers to comply with the

prescription of the gas referees, and power is given to the Board of Trade to make special orders.

The Legal and Parliamentary Committee of the Institute, being of opinion that provision should be made for ensuring the competency of gas examiners appointed by local authorities, took steps to suggest to the Board of Trade that persons selected for such appointments should be approved by the Board. The Bill was then in its final stages, however, having been presented in the House of Lords by Lord Londonderry, and the Board replied that, having regard to the stage the Bill had reached, they would not feel justified in introducing an amendment, and pointed out that the clause as it stood provided that any gas examiner who might be appointed by the local authority or by quarter sessions must be a "competent and impartial" person.

Remuneration of Chemists.—In view of the interest aroused on the publication in Part I. of the Journal and Proceedings in February last of particulars of the pay statistics of chemists holding whole-time appointments and of the desirability of offering members this means of gauging their economic position under present conditions, the Council have decided to send out a further circular letter and form for reply, in the hope that they may be enabled to ascertain whether the average remuneration of such chemists is changing proportionately to the increased cost of living.

From careful observation of the work of the Appointments Register, a fairly satisfactory general improvement may be anticipated, since many members have changed their positions during the past twelve months, and very few are now actually without appointments.

Professional Fees.—Enquiries are still frequently received at the Institute with regard to the fees which should be charged for analyses and investigations conducted by practitioners. An increase of 50 per. cent. on pre-war fees is now regarded as inadequate for the general run of work, and many consultants have found it imperative to double their pre-war charges.

Chemists in War.—The Publications Committee regret that they have been obliged, for various reasons, to abandon the proposal to publish a formal volume recording the services rendered by chemists during the war. A number of chemists had kindly offered to co-operate in the work, but the subject is so extensive and the problem of collating and co-ordinating the various divisions of it so involved, that the authorship could hardly be undertaken except by a chemist not only well acquainted with all the activities of chemists throughout the war period, but also able to devote the necessary time exclusively to it.

Research Chemicals.—The Council have received from the Association of British Chemical Manufacturers a more complete list of the research chemicals which can be supplied by members of the Association. The list contains the names of 505 substances, with an indication of the firms who are in a position to supply them, and in addition a supplementary list of 30 substances which members of the Association are prepared to make if there is sufficient demand. The Association appeals for the support, on behalf of the British fine chemical industry, of all research chemists in this country, both on patriotic grounds and in recognition of the work done by this industry in supplying the needs of the naval and military forces and of the general public, during the war. The Association points out that the next few years will be critical, and unless sympathetic treatment is received from the Government, and cordial support from research chemists, the industry will inevitably fall back into its pre-war state of comparative insignificance.

Copies of the lists have already been sent to a number of research workers in the country. Members may obtain copies on applying to the Association of British Chemical Manufacturers, 166, Piccadilly, London, W. 1.

Local Sections.

Glasgow and West of Scotland Section.—The Glasgow Section is interested in a proposal to establish a Social Club for Engineers, Shipbuilders, Chemists and Metallurgists, to be styled the “James Watt Club.” It has long been felt in Glasgow that a Club was wanted where scientific and technical men could meet on their own ground with others of kindred thought and action. As the result of much discussion in the various scientific societies, it was eventually arranged that each should send delegates to a meeting, which was duly held. After discussion, it was resolved that a club was necessary, and a provisional working committee was appointed by the delegates. The above name for the Club was suggested as being associated with all branches of engineering and technical thought and interests.

The Committee consists of ten members representing the following bodies: The Institution of Engineers and Shipbuilders in Scotland, the Institution of Electrical Engineers, the West of Scotland Iron and Steel Institute, the Institute of Chemistry, the Society of Chemical Industry and the Royal Aeronautical Society. The Committee has approached Lord Weir to become first Hon. President of the Club, and he has agreed to do so provided that a satisfactory scheme be evolved.

It is proposed that the Club be on the lines of the best political clubs, the objects to include providing facilities for exchange of opinion on technical matters among engineers, shipbuilders, chemists, metallurgists, and others of kindred thought or those closely associated therewith. Qualification for membership, being such as would gain admission to the various scientific societies promoting the club, it is hoped that affiliation may be arranged with similar clubs in other centres.

The Committee have reported that suitable premises are available at a reasonable cost, and it is now desired to interest all who can substantially support such a scheme in order to secure the premises and thereafter to proceed with the formation of the Club.

The Committee are satisfied that, having behind them the support of the various technical and scientific societies from the outset, a substantial membership can be obtained.

It is proposed that the club should be incorporated under the Companies Act, 1906-1917, and it is hoped that prospective members who can do so will apply for large blocks of shares. These gentlemen will be closely consulted in the formulation of the constitution of the Club.

Communications on the subject may be addressed to Mr. E. H. Parker, Hon. Secretary *pro tem.* 39, Elmbank Crescent, Glasgow; or to Douglas A. MacCallum, F.I.C., 93, Hope Street, Glasgow; or to Prof. F. J. Wilson, D.Sc., Ph.D., F.I.C., Royal Technical College, Glasgow.

Liverpool and North-Western Counties.—On June 10th, Dr. George Tate read a paper on the chemical characteristics of some *Torulae* related to higher parasitic fungi. Dr. Tate gave a sketch of the nature of the fungi which are parasitic upon plants, and detailed the life history of the white rust fungus which attacks cruciferous plants such as the cabbage, and the rust fungus, which starts its cycle of life as a cluster cup or ascidium on the leaves of the common coltsfoot weed. He referred to the polymorphism of the parasitic fungi and the power many have of spending a cycle of life on intermediary "host-plants," thereby apparently acquiring increased virulence as plant diseases. As very few of these intermediary hosts are known, chemical knowledge acquired respecting the characteristics of parasitic fungi should be of use in recognising them and obtaining more knowledge of their intermediary hosts, as well as in other directions. Such knowledge should help towards mitigating the virulence of epidemic attacks on plants of economic importance.

In the course of his investigations, Dr. Tate had observed that the spores of many parasitic fungi when brought on to suitable nutrient media gave rise to saprophytic growth of torulæ or simple budding fungi. Many of these he had isolated and grown as pure cultures with the view to determining their characteristics. Trials were being made to observe whether these toruloid conditions gave rise to the same plant diseases as those produced by the higher fungi from which they were obtained. In illustration of the different types of torulæ obtainable, Dr. Tate showed torulæ from two different species of smut, or *ustilago*, viz. : the smut of barley and the smut which attacks the anthers of the campions. The former hydrolysed cane sugar and raffinose, whereas the latter did not. The torulæ from the barley smut used up starch and glycerine, while those from the anther smut used up no recognisable proportion. Microscopic observations indicated that these torulæ were phase forms of the higher parasitic forms, conclusions more or less confirmed by obtaining from the anther smut the same torulæ from diseased plants from widely separated districts and at different seasons of the year. The torulæ obtained from *cystopus candidus* and *cystopus spinulosus* showed notable differences in their attack on cane sugar. Analogous growths on solid culture media were exhibited as having been obtained from the *Uredo* or summer spores of *Uredines* fungi and from the *Peronospera*, parasitic upon cruciferous plants. Torulæ have not so far been obtained from the *Teleuto* or winter spores of the *Uredines*. The subject was illustrated by numerous specimens of fungi parasitic on plants.

The next meeting of the Section will be held on October 14th.

Personal.

Sir Herbert Jackson, President of the Institute, has been appointed a Governor of the Imperial Mineral Resources Bureau.

H.M. the King of Italy has appointed Mr. (now Dr.) L. A. Jordan a Chevalier of the Order of the Crown of Italy.

Prof. Sydney Young has been appointed a Member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

The appointment of Mr. George Tattersall as an Honorary Corresponding Secretary of the Institute for Western Australia has been confirmed.

Dr. J. E. Coates, Examiner to the Institute in the branch of Physical Chemistry, has been appointed Professor of Chemistry at the newly constituted University College of Swansea.

Mr. C. O. Bannister has been appointed Professor of Metallurgy in the University of Liverpool.

Dr. T. M. Lowry, C.B.E., has been elected Professor of Physical Chemistry in the University of Cambridge. This is a first appointment to a newly created chair.

Prof. F. J. Wilson has transferred from the Chair of Inorganic Chemistry to that of Organic Chemistry, and Mr. W. M. Cumming, hitherto of the British Dyestuffs Corporation, Ltd., has been appointed Senior Lecturer in Organic Chemistry, at the Royal Technical College, Glasgow.

The Council have appointed Dr. Bernard Dyer as Examiner to the Institute in Branch D : Agricultural Chemistry, under the new Regulations.

Obituary.

ARNOLD BOSWELL died in his 27th year. Born at Camberwell, and educated at Wilson's Grammar School, he matriculated at London University in 1910, and then entered Corpus Christi College, Cambridge. On graduation he proceeded to take Part II. of the Natural Sciences Tripos in 1916, and became engaged as a chemist at H.M. Factory, Oldbury.

He was elected an Associate of the Institute in 1918.

JACOB GROSSMANN died at Manchester in his 66th year. He was trained at the Universities of Leipzig and Heidelberg, graduating in the latter as M.A. and Ph.D., and, after working for two years (1873-1875) with Marquardt at Bonn, and with Schuchardt at Goerlitz, assisted Sir Henry Roscoe for one year at Manchester. He was for six years chemist to Messrs. J. C. Gamble and Son at St. Helens, when he became engaged as a chemical manufacturer at the Harpurhey Chemical Works. He contributed papers on analytical and technical processes to the Transactions of the Literary and Philosophical Society of Manchester, the Journal of the Society of Chemical Industry, and the Chemical News. He was for a time Chairman of the Manchester Section of the Society of Chemical Industry.

He was elected a Fellow of the Institute in 1900.

ALFRED KIRBY HUNTINGTON, who died in London on April 17th, in his 65th year, was trained in the Royal School of Mines, taking the Associateship of the School in Mining and Metallurgy in 1877. For nearly 40 years he was Head of the Metallurgical Department of King's College, London, and for about ten years Lecturer on Metallurgy in the Medical School of the Dental Hospital. He was author of a *Text-book on Metals*, in Longmans' Science Series, of which a subsequent edition was prepared jointly with W. G. MacMillan; and contributed papers to the Journals and Transactions of various Societies, including papers on the Mexican amalgamation process and the metallurgy of nickel and cobalt, read at the first Annual Meeting of the Society of Chemical Industry in 1892, and a paper on the concentration of metalliferous sulphides by flotation, read before the Faraday Society in 1905. He was the second President (in 1894) of the Institution of Mining and Metallurgy, of which he remained a member of Council until his death, and was President (in 1913) of the Institute of Metals. He was an experienced balloonist and an authority on aeronautics. During the war he was engaged upon investigation in connection with explosives for the Admiralty. He was elected a Fellow of the Institute in 1878, and served as a member of the Council from 1885-1888.

ROBERT McALLEY died in his 76th year. He was trained in the Andersonian University, Glasgow, under Professor Penny, with whom he remained for about seven years as an assistant and as demonstrator in the University. He was then for two years chemist in the print-works of Messrs. Inglis and Wakefield, at Busby, near Glasgow, before he established a practice at Falkirk. He was appointed Public Analyst for the Burghs of Falkirk (1876) and Stirling (1877), and taught in the local Science and Art School.

He was elected a Fellow of the Institute in 1886.

RUDOLPH MESSEL died in London, on April 18th, aged 72 years. Born at Darmstadt, he studied at Zürich, Heidelberg and Tübingen, graduating at the last-named University in 1868. Coming to England a few years later he became assistant to Sir Henry Roscoe, and then entered the laboratory of Messrs. Dunn, Squire and Co., Chemical Manufacturers, at Stratford, London. In 1876 he published jointly with Dr. Squire a paper read before the Chemical Society on the preparation of sulphuric anhydride, and in the following year an English patent was granted for the production of anhydrous acid by the catalytic process, and the first plant was completed at Silvertown. In 1878 he became managing director of his Company, known thereafter as Spencer Chapman and Messel, and continued to fill that office until 1916, when he retired owing to ill-health. He was elected a Fellow of the Royal Society in 1912. He was twice President, and for many years Honorary Foreign Secretary of the Society of Chemical Industry and was a governor of the Imperial College of Science and Technology. He was elected a Fellow of the Institute in 1914.

LUCIUS TRANT O'SHEA died at Sheffield in his 63rd year. Educated at Manchester Grammar School, he entered Owens College, where he was trained under Sir Henry Roscoe, graduating as B.Sc. (Lond.). After acting for two years as private assistant to Prof. Schorlemmer, he was for one year chemist to the Cotton Powder Company at Ormskirk. In 1880 he was appointed Demonstrator in Chemistry at Firth College, now the University of Sheffield, where he became Lecturer in Mining Chemistry in 1890, and was appointed Professor of Applied Chemistry in 1908. His work in recent years was mainly concerned with coke-oven developments and carbonisation. He had given much attention to the prevention of explosions in coal mines; and was the author of *Elementary Chemistry for Coal Mining Students* and of papers contributed to the Journal of the Chemical Society and the Transactions of the Institution of Mining Engineers, of which latter body he was Hon. Secretary. He served in the South African War in command of the 1st West Yorks. Royal Engineer Volunteers, and during the late War as Officer Commanding the Sheffield University Officers' Training Corps. He was elected a Fellow of the Institute in 1918.

WATSON SMITH, an Original Fellow of the Institute, died at the age of nearly 75 years. Born at Stroud, he received his early training in chemistry under Sir Henry Roscoe at Owens College, proceeding later to Heidelberg and subsequently to Zürich, where he worked under Lunge. After some years in industry and private practice he was appointed Lecturer in Technological Chemistry at Owens College, where he remained until 1889. He was Editor of the *Journal of the Society of Chemical Industry* for thirty-two years (1882-1914), and continued a member of the Transactions and Abstracts Section of the Publication Committee until his death. His investigations were mainly on the subject of coal, and especially directed to economical methods of coking, in which he did pioneer work. He was an Examiner for the Institute for two periods (1883-1887, 1888-1892).

ARTHUR WINGHAM died on 24th May, 1920, in his fifty-ninth year. He received his training at the Royal School of Mines, where he was appointed Junior Demonstrator under the late Sir Edward Frankland. From 1882 to 1886 he was Chemist at the Broughton Copper Co., when he returned to the Royal School of Mines to carry out a series of investigations on English Tobacco. From 1887-1888 he carried out under Sir W. Roberts-Austen an investigation into Oriental Alloys. In 1889 he was appointed an Assistant Examiner at the Science and Art Department in Chemistry, and was also engaged as Assayer at the Royal Mint. Early in 1890 he was invalided owing to a severe attack of blood poisoning contracted during his laboratory work, which ultimately resulted in spinal paralysis, and after a prolonged illness he was discharged as incurable. From that time until his death, his life was one of prolonged suffering borne manfully and cheerfully. He developed further organic troubles in 1919 and underwent an operation, from which he did not recover. He was elected a Fellow of the Institute in 1887.

July Examinations.

Abstract of the Report of the Board of Examiners.—The Examinations were held at the places and on the dates given below :—

Branch (*b*)—For the Associateship and Fellowship, at the Institute, July 12th to 16th.

Branch (*d*)—For the Associateship, at the Institute, July 12th to 16th; and at the Royal Technical College, Glasgow, from July 5th to 9th.

Branch (*e*)—For the Associateship, at the Institute, July 12th to 16th.

Branch (*g*)—For the Fellowship and Associateship :—

In the Chemical Technology of Textile Manufacture, at the College of Technology, Manchester, July 12th to 16th.

In the Chemical Technology of Coal-Tar Dyestuffs, at the College of Technology, Manchester, July 12th to 16th.

New Regulations :

General Chemistry—For the Associateship, at the Institute, July 12th to 16th.

Branch (*d*)—Agricultural Chemistry. For the Fellowship, at the Institute, July 12th to 16th.

Sixteen Candidates presented themselves ; the number examined in each branch and the number of those who passed are shown in the following table :—

	NUMBER EXAMINED.	NUMBER PASSED.
General Chemistry, for A.I.C.	1	0
Branch (<i>a</i>) Mineral Chemistry :		
For A.I.C.	1	1
Branch (<i>b</i>) Metallurgical Chemistry :		
For F.I.C.	1	1
For A.I.C.	1	1
Branch (<i>d</i>) Organic Chemistry :		
For A.I.C.	4	2
Branch (<i>e</i>) Chemistry of Food and Drugs, etc. :		
For A.I.C.	4	3
Branch (<i>g</i>) Chemical Technology. Chemical Technology of Textiles :		
For F.I.C.	1	1
Chemical Technology of Coal Tar Dyestuffs :		
For A.I.C.	1	1
Examination for Fellowship :		
Branch D : Agricultural Chemistry	2	2
	<hr/> 16	<hr/> 12

In the case of one candidate in Branch (e), the Board recommend that when he presents himself again, he be not required to pass any part of the Examination except in general chemistry.

The following Candidates satisfied the Board :—

For the Fellowship.

Knowles, George Edward	..	..	..	Branch (g)
Melville, Archibald Carswell	..	..	..	„ (b)

For the Associateship.

Cocks, Leslie Victor	..	..	..	Branch (d)
Dakers, Robert Gillies Muir	..	..	..	„ (d)
Greenberg, Solomon	..	..	..	„ (e)
Hollingsworth, Clifford	..	..	..	„ (b)
Morris, Edgar Archibald	..	..	..	„ (a)
Newcombe, Vera	..	..	..	„ (e)
Potter, Alfred	..	..	..	„ (g)
Winch, Hope Constance Monica	..	..	..	„ (e)

The following Associates have passed the examination for the Fellowship (and will be entitled to apply for election to the Fellowship on the completion of three years registration as Associates) :—

Auchinleck, Gilbert Grahame	..	..	Branch D.
Whalley, Hubert Charles Siegfried de	..	..	„ D.

The practical work of the successful Candidates was satisfactorily carried out.

The Candidates were, in some cases, insufficiently prepared for the *viva voce* examination in general chemistry ; they appeared to have relied mainly upon the reading of past years, and to have made no special study for the examination.

The papers and particulars of the exercises, etc., are attached.

The thanks of the Council have been accorded to the authorities of the College of Technology, Manchester, and of the Royal Technical College, Glasgow, for laboratory accommodation, and to Professor Allmand and Mr. A. C. Chapman for the loan of microscopes.

The Board of Examiners is indebted to Professor E. Knecht and to Mr. F. M. Rowe for help in connection with the Examinations in Chemical Technology.

Examination Papers, July 1920.

Branch (a)—Mineral Chemistry. July 12th to 16th, 1920.

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

1. State how you would prove experimentally the course of the following reactions :

- (a) The action of sulphuretted hydrogen upon a 10 per cent. solution of arsenic acid.
- (b) The action of hydrogen containing hydrogen arsenide upon an aqueous solution of silver nitrate.

2. Give a detailed account of the methods of preparation of perchloric, hydrofluosilicic and hypophosphorous acids. State the analytical uses of these acids, the impurities which may be expected to be present from the mode of preparation, and indicate the effects of these impurities when these acids are employed as reagents.

3. Mention the chief ores of chromium and give an account of the industrial methods of extraction from the ores. State some of the more important uses of chromium and the chromates.

4. Discuss the properties of fluorine and its compounds as a member of the halogen group. Draw up a scheme for the accurate determination of fluorine in the presence of calcium and magnesium silicates and free silica.

5. Write a short essay on one of the following :

- (a) Industrial applications of catalysis in the domain of mineral chemistry.
- (b) A chemical reaction, carried out on the industrial scale, at high temperatures and pressures, in which at least one of the substances reacting is a gas.
- (c) Recent work on clays from the chemical standpoint.

TUESDAY and WEDNESDAY, JULY 13th and 14th : 10 a.m. to 4.30 p.m.

1. Make a complete analysis of the limestone (A) and report on its suitability for the manufacture of calcium carbide.

(This exercise may be completed to-morrow.)

2. Sample (B) is a crude potassium nitrate. Determine the nature and amounts of the impurities and also the nitrate present expressed as (NO_3).

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

1. Sample (C) is the scum from a melted hardening alloy. Make a qualitative examination for carbon, manganese dioxide and copper.
2. Estimate moisture, ash, volatile matter and sulphur in the fuel (D). Give an opinion as to its nature and commercial value as a fuel.
(*This exercise may be completed to-morrow.*)

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

1. Prepare a specimen of ferrous ammonium sulphate in fine crystals (not less than 10 grams.).
2. Determine the aluminium in the alloy (E).

Branch (b)—Metallurgical Chemistry. July 12th to 16th, 1920.

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

(*Five questions only to be attempted.*)

1. Describe the chemical reactions which occur during the reduction of an iron ore in the blast furnace, including the formation of the gaseous products and of the slag.
2. How is copper extracted from a rich copper matte? Give equations for the chemical reactions involved.
3. Explain the part played by phosphorus in the basic Bessemer process. Why is it impossible to remove phosphorus in the manufacture of steel by the original Bessemer process? What conditions determine the value of basic slag as a phosphatic manure?
4. How is the hardness of a metal determined? What relations exist between the hardness of a metal and its other physical properties?
5. Construct a diagram of thermal equilibrium for the alloys of gold and lead from the following data: Gold melts at 1064° and lead at 327° ; two compounds are formed, both of which decompose on melting, Au_2Pb at 418° and AuPb_2 at 254° , there is a eutectic point at 215° and 85 per cent. of lead, and solid solutions are not formed.
6. Describe one method for the manufacture of metallurgical coke with recovery of by-products, and make sketches showing the construction of the oven.
7. What changes take place in the annealing of a cold-rolled metal, such as brass? How would you determine whether a metal had been properly annealed? What is the effect of over-annealing?

TUESDAY and WEDNESDAY, JULY 13th and 14th : 10 a.m. to 4.30 p.m.

Make a full analysis of the given sample of steel.

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

Prepare and etch the two given specimens, and report on their micro-structure.

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

Assay the given ore for silver and gold.

General Chemistry. July 12th to 16th, 1920.

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

1. Describe two methods by which hydrogen is now prepared on the large scale for industrial purposes.
2. What oxy-acids of chlorine are known, and how may their potassium salts be prepared?
3. Discuss the action of steam on carbon at varying temperatures and the chemical and thermal changes which take place in the reaction.
4. Write a short account of hydrogen peroxide and explain its relation to persulphuric and permonosulphuric acids.
5. Mention the most important ores of zinc. How is the metal obtained from these ores?
6. How may (a) sodium hydrosulphite and (b) sodium thiosulphate be prepared? Describe their chemical properties and give the constitutional formulae you would suggest for these substances and the facts on which your view is based.

2 p.m. to 5 p.m.

1. How would you prepare samples of the following:—(a) chloropicrin; (b) ethyl malonate; (c) tolue-nitrile; and (d) benzo-phenone?
2. What different types of the "diene" series of hydrocarbons can exist, and how do these differ chemically from the isomeric homologues of the acetylene series?
3. What substances may be prepared by the reduction of nitrobenzene? Mention the reducing agent employed in each case.
4. What is meant by the molecular conductivity of a solution? How may it be applied to determine the degree of ionisation of a dissolved salt?
5. Explain how the refractive index of a carbon compound may be used in determining the constitution of the substance.
6. Describe the means of preparation and the chief properties of ketoximes, and write a note on the stereoisomerism exhibited by these compounds.

TUESDAY and WEDNESDAY, JULY 13th and 14th : 10 a.m. to 4.30 p.m.

1. Substance (A) is a sample of zinc blende. Determine the following constituents in it:—
Moisture, iron, zinc, sulphur.
2. Prepare a sample of pure crystallised ferric ammonium alum from a sample of commercial ferrous sulphate.
(These exercises may be completed to-morrow.)

THURSDAY and FRIDAY, JULY 15th and 16th : 10 a.m. to 4.30 p.m.

1. Prepare a sample of pure aluminium chloride from the metal and employ your product to prepare acetophenone from benzene and acetyl chloride.
2. Prepare a specimen of pure acetic anhydride from acetyl chloride.
(These exercises may be completed to-morrow.)

Branch (D)—Agricultural Chemistry. July 12th to 16th, 1920.
(Regulations, 1920.)

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

1. Give some account of the principal well-recognised micro-organisms which exercise beneficial action in the soil, assigning to each its special function.

Write a short account of the investigations carried out in recent years on what is known as "Soil Sterilisation," and indicate their practical bearing.

2. Discuss the nature of the principal causes of loss during the storage of farmyard manure, and indicate the methods of mitigating such losses.

3. What kinds of soil are benefited by the application of lime? In what forms and in what quantities per acre is it used? And what are its special functions in the soil?

2 p.m. to 5 p.m.

1. What is meant by the "albuminoid ratio" in the diet of animals, and under what practical farming conditions or circumstances is its consideration of especial importance?

2. Indicate the approximate percentages of the chief manurial constituents in (a) raw bone meal, (b) steamed bone flour, (c) fish guano, (d) dried blood, (e) hoof and horn meal, (f) kainit, (g) well-made farmyard manure.

3. What features in the growth and metabolism of crops are especially affected by sufficiency and insufficiency of available potash in the soil? Mention any farm crops that differ from others in their ability to gather the necessary quantity of potash for their well-being from the same soil and how is this recognised in their manurial treatment?

4. State the average composition of the milk of Jersey cows and of the Dutch or Friesian cows respectively. Describe briefly three distinct methods for the determination of the percentage of fat in milk.

TUESDAY, JULY 13th : 10 a.m. to 4.30 p.m.

Make a full analysis of the sample of ground feeding cake, and identify it by microscopical examination.

(This exercise may be completed to-morrow.)

WEDNESDAY, JULY 14th : 10 a.m. to 4.30 p.m.

Determine the water-soluble sulphuric acid (SO_3) and potash in the sample of potash salt. (The potash determination is to be carried out by the perchlorate method.)

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

1. Determine the total phosphate (calculated as tri-calcium phosphate) in the sample of basic slag.

2. Determine the lime in the sample of soil and report how the result would affect your recommendation as to its treatment for a prospective turnip crop.

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

1. Analyse as far as you can in one day the sample of sheep-dip provided.
2. Identify by inspection the various specimens shown to you.

Branch (d)—Organic Chemistry. July 12th to 16th, 1920.

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

1. Describe the more important reactions of pyridine and quinoline, and contrast the behaviour of the derivatives of these substances with that of the corresponding members of the benzene series.
2. Utilising as second components H acid* and γ acid,† give brief details illustrating the methods by which you would prepare azo-dyes (a) having the property of being diazotised and developed on the fibre, and (b) without this characteristic property.
3. Give a short account with fairly full experimental details of one general method by which compounds of the purine series can be prepared.
4. Discuss a method which is used on the large scale for the preparation of saccharin (550).

* 1:8—Amidonaphthol—3:6—disulphonic acid.

† 2:8—Amidonaphthol—6 monosulphonic acid.

TUESDAY, JULY 13th : 10 a.m. to 4.30 p.m.

1. (A) is a solution of R salt (2-naphthol 3:6-disulphonic acid); you are required to standardise the solution against pure aniline.
2. Analyse qualitatively the mixture (B).

B. 1. Quinine sulphate, urea, potassium ferrocyanide.

WEDNESDAY, JULY 14th : 10 a.m. to 4.30 p.m.

1. (C) is a mixture of aniline, methylaniline and dimethylaniline; you are required to determine the amount of each constituent of the mixture by the method of Reverdin and De la Harpe, using the solution of R salt estimated yesterday. (Particulars of the method were supplied.)
2. Identify the organic compound (D).

D 1. Ethyl acetoacetate. D 2. Ethyl malonate.

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

1. Analyse qualitatively and quantitatively the mixture (E) which contains two sugars.
- E. 1. Sucrose and glucose. E. 2. Sucrose and laevulose.
2. Identify the substances (F) and (G).
- F. 1. Toluene-para-sulphonamide. F. 2. Benzamide.
G. 1. Resorcinol. G. 2. Mannitol.

(This exercise may be completed to-morrow.)

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

1. Prepare and charge a tube for the estimation of bromine in (H) by the method of Carius. (Bromobenzene.)
2. Isolate and identify the acid of the ester J. From the result of a quantitative hydrolysis of the ester, calculate the molecular weight of the alcoholic radicle. (Ethyl p-nitrobenzoate.)

Branch (e) —The Chemistry (and Microscopy) of Food and Drugs, etc. July 12th to 16th, 1920.

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

1. Describe the chemical constitution of meat extracts. What do you suppose to be the part played by them as a food adjunct?
2. Draw up a report on a sample of milk which gave on analysis the following figures:—

Total Solids:—

Fat	..	..	..	..	..	3.00
Proteids	..	..	..	..	..	3.60
Lactose	..	..	..	..	..	3.64
Ash	..	..	..	..	..	0.70

3. How would you determine quantitatively the extent of contamination with tin in a sample of "tinned" fruit?

Answer in a separate note-book.

1. What are the botanical sources of aconitine, emetine, and pilocarpine? Describe in each case the crude drug which contains the active principle, and enumerate its pharmacopœial preparations.
2. What are the criteria of a good microscopic objective? Discuss the use of the polariscope in microscopy.
3. Under what conditions is poisoning by carbon monoxide likely to occur? Describe the symptoms which characterise it, and state what evidence could be obtained to prove that, in a given case, it was the cause of death.

2 p.m. to 5 p.m.

1. Examine microscopically the sample of wheaten flour, (A), and report upon it. (Pure wheaten flour.)
2. Report upon the nature of the stain upon the cloth (B). (Blood.)
3. C is powdered nux vomica. Extract its chief alkaloid and demonstrate to the examiner tests for its identification.

TUESDAY, JULY 13th : 10 a.m. to 4.30 p.m.

1. Examine the sample of sweet spirit of nitre and express your result in proper form on the blank certificate provided.
2. The white powder is a mixture of sugar and of a synthetic drug. Identify the latter. (1. Aspirin; 2. Acetanilide.)

WEDNESDAY, JULY 14th : 10 a.m. to 4.30 p.m.

The sample provided consists of starch-glucose syrup. Determine the optical rotation and copper-reducing power and the specific gravity of a 10 per cent. solution and deduce from your results the approximate chemical constitution of the syrup.

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

1. (A) is a sample of fruit juice, which is stated by the vendor to be preserved with "a small quantity of salicylic acid." Estimate the quantity of preservative, and state whether or not you consider it to be excessive, and why.

2. Determine the water-soluble sulphuric acid (SO_3), and potash in the potash fertiliser. (The potash determination is to be carried out by the Perchlorate method.)

(This exercise may be completed to-morrow.)

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

Report as fully as you can on the sample of butter fat.

**Branch (g)—Chemical Technology of Textiles.
July 12th to 16th, 1920.**

MONDAY, JULY 12th : 10 a.m. to 1 p.m.

General Chemical Technology.

(Not more than five questions to be attempted.)

1. It is known that most colouring matters are thrown out of their aqueous solutions by the addition of salt. Explain the principle underlying this process.

2. Describe, with the aid of sketches, any form of refractometer with which you are familiar, and mention some of the principal uses for which this instrument is employed in chemical work.

3. Explain the principles underlying the purification of a substance such as nitrobenzene by steam distillation.

4. You are required to determine the coke and volatile matter in a sample of coal. State how you would proceed, and what inferences you would draw from the results.

5. In what essential points do the products of high and low temperature carbonisation of coal differ from each other?

6. Briefly describe the methods in use for the production of ammonia and nitrates from the air.

2 p.m. to 5 p.m.

Not more than five questions to be attempted.

1. Give some account of the action of sulphuric acid on castor oil, and mention any recent work that you have read on the subject.

2. What changes are considered to take place in the drying of an oil? How are these changes affected by the addition of catalysts?

3. How would you estimate the unsaponifiable matter in a lubricant consisting of a mixture of rape oil and a hydrocarbon oil?

4. What are the more important characteristics of gallotannic acid? State briefly its principal applications, and mention any of its commercially important derivatives.

5. What is the chief constituent of ordinary French rosin, and how may this substance be obtained in the crystallised state? Enumerate the principal uses of the rosins in industry.

6. Write a brief account of the manufacture of any one of the following substances: aniline, oxalic acid, acetic acid, cellulose acetate, lactic acid.

TUESDAY, JULY 13th : 10 a.m. to 1 p.m.*Textile fibres and their preparation.**(Five questions only to be attempted.)*

1. What means have been suggested for ascertaining whether a cotton fabric has been mercerised or not, and upon which of these would you place most reliance ?

2. It is known that electrolysed brine bleaches more rapidly than a solution of bleaching powder or of chemically prepared sodium hypochlorite of equivalent strengths. How may this be accounted for on theoretical grounds ?

3. What is the object of weighting silk ? State in outline how this is usually effected (*a*) for blacks, (*b*) for colours.

4. What is meant by the term "permanent" finish, and how does this finish differ in its quality and in its mode of production from an ordinary Schreiner finish ?

5. In what way is cellulose affected by oxidising agents ? How may the degree of oxidation be ascertained and expressed ?

6. Describe the Manzoni process of bleaching and give instances in which this process has been found advantageous.

*2 p.m. to 5 p.m.**Colouring matters and their application.**(Not more than five questions to be attempted.)*

1. How would you explain the dyeing of wool with an acid colour such as fast red A and with a basic colour such as crystal violet ?

2. Classify and describe briefly the methods in use for obtaining white discharges on indigo in calico printing

3. What is the composition of "nitrosamine red," and how is this substance ordinarily employed in the production of paranitraniline red ? What attempts have been made to utilise the nitrosamines for the direct production of insoluble azo dyes on unprepared material ?

4. How would you obtain a black on wool (*a*) with logwood, (*b*) with diamond black ? Contrast the two colours from the points of view of economy and of fastness.

5. What means have been suggested for improving the fastness of direct colours on cotton (*a*) to light, (*b*) to washing ?

6. Describe the dyeing of a "copper" aniline black on cotton linings and explain, as far as you are able, the chemistry of the process.

THURSDAY, JULY 15th : 10 a.m. to 4.30 p.m.

1. Identify the colouring matters in the dyed fabrics submitted.

2. Estimate the copper number in the sample of oxycellulose submitted.

FRIDAY, JULY 16th : 10 a.m. to 4.30 p.m.

1. Estimate quantitatively the amount of dyestuff in each of the two solutions submitted (methyl violet and crystal scarlet), and express your results in grams per litre.

2. Ascertain and report on the cause of the defects in the two samples of fabric submitted.

Branch (g)—Chemical Technology of Coal Tar Dyestuffs.

TUESDAY, JULY 13th : 10 a.m. to 1 p.m.

Intermediate Products.

(Candidates are required to attempt five questions out of six.)

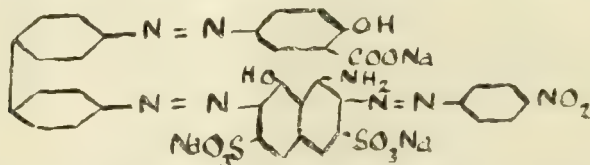
1. Describe the principle of a continuous still, with special reference to its application in dealing with coal-tar.
2. State the rule governing the introduction of nitro groups into hydrocarbons of the benzene and naphthalene series. How is the result affected by the presence of an OH group in the compound?
3. What general methods are employed for the introduction of the NH_2 group into aromatic compounds? Give examples.
4. Describe methods for the estimation of any two of the following:—"R salt," dimethylaniline, benzaldehyde, anthracene.
5. Describe the manufacture of B-naphthol from purified naphthalene.
6. Outline a process for the manufacture of a 90 per cent. anthracene. State the principal commercial uses of this substance.

2 p.m. to 5 p.m.

Colouring Matters.

(Candidates are required to attempt five questions out of six.)

1. Explain what is meant by the Quinonoid Theory of colour, and discuss its limitations.
2. How would you prepare the following Azo-dye?



What products are obtained from it on complete reduction?

3. How is β -aminoanthraquinone obtained? Give some account of its uses in the preparation of vat dyes.
4. How is tartrazine prepared, and what is its constitution? Give some examples of other important dyes of this series.
5. How is patent blue obtained? What is the constitution of this dye, and in what respects is it superior to the acid greens and soluble blues?
6. What is the constitution of alizarine viridine? How is this dye obtained, and to what properties does it owe its great value as a dye?

THURSDAY and FRIDAY, JULY 15th and 16th : 10 a.m. to 4.30 p.m.

1. Identify the samples of dyes numbered 1, 2, 3, and 4, and state whether you consider them to be uniform products.
2. Estimate the purity of the sample of benzidine and carry out the technical examination of the sample of dimethylaniline with which you are provided.
3. Prepare a well crystallised specimen of p-aminoacetanilide from the acetanilide provided. State the yield obtained.
4. Determine the constitution of the Azo dye provided, and prepare specimens of the products obtained.

Candidates were required to translate the following passages from French and German :—

En résumé, les principaux faits, observés relativement à la constitution des alliages fer-carbone, peuvent s'interpréter de la façon suivante : Les alliages de fer et de carbone contenant moins de 0.9 pour 100 de carbone sont formés, quand ils sont recuits, par des grains de fer à peu près purs (ferrite), entourés de perlite ; la proportion de ce dernier constituant augmente avec la teneur en carbone et forme à peu près la totalité du métal à 0.9 pour 100 de carbone. Quand on élève la température graduellement, il se produit à 700° une absorption de chaleur, la perlite s'homogénéise et produit une solution solide ; si la température continue à s'élever, la ferrite en excès se dissout graduellement et le métal devient complètement homogène au-dessus d'une température (a_3) d'autant plus élevée que la teneur en carbone est plus faible. Par un refroidissement brusque on peut maintenir partiellement l'état correspondant à la température à laquelle était chauffé le métal, surtout dans les parties extérieures, on maintient certainement les constituants à un état de division extérieure, et l'on produit sur le métal un écrouissage énergétique, toutes causes qui peuvent, suivant les circonstances, avoir une influence prépondérante, et qui tendent à modifier les propriétés du métal dans le même sens, augmentation de la résistance et diminution de la malléabilité.

Traité de Chimie Minérale.—Tome IV.

HENRI MOISSAN.

Translate into English.

Endlich stellt die Erörterung der Kohlenstoffverbindungen andere theoretische Aufgaben als die Behandlung der anorganischen Verbindungen. Bei einer anorganischen Substanz genügt in der Regel zur Erklärung ihrer Verschiedenheit von allen anderen Stoffen die Angabe ihrer molecularen Zusammensetzung, soweit dieselbe durch die Anzahl und Art der zu einem Molecül zusammentretenden Elementaratome bedingt ist. Ist z.b. für die Schwefelsäure erkannt, dass ihr Molecül aus 2 Atomen Wasserstoff, 1 Atom Schwefel und 4 Atomen Sauerstoff besteht, so können wir uns zunächst mit diesem Befund begnügen ; denn wir kennen keine zweite Verbindung, welcher gleichfalls eine durch die Formel H_2SO_4 ausdrückbare Zusammensetzung zukommt. Aber für eine organische Verbindung ist mit der Erkenntnis ihrer "empirischen" Zusammensetzung viel weniger geleistet. Der Aethylalkohol z.b. besitzt die Zusammensetzung C_2H_6O ; dieser Befund genügt indessen nicht, um zu erklären, warum der Aethylalkohol ein besonderes chemisches Individuum mit bestimmten charakteristischen Eigenschaften ist ; denn wir kennen eine zweite Verbindung : den Dimethyläther, welche ganz andere Eigenschaften besitzt, während ihr Molecül genau dieselben Elementaratome in derselben Anzahl— 2 Kohlenstoffatome, 6 Wasserstoffatome und 1 Sauerstoffatom—enthält.

MEYER-JACOBSON.

The following Papers in Biological Chemistry which were set for the Examinations held in October, 1918, and November, 1920, have not previously been published :—

Branch (f)—Biological Chemistry. October 25th to 29th, 1918.

MONDAY, OCTOBER 25th : 10 a.m. to 1 p.m.

1. Write a brief essay on the so-called "accessory growth substances."

2. Give an account of the main principles underlying the modern methods adopted for the treatment of domestic sewage. What are the more important chemical differences between a sample of crude sewage and one of a satisfactory effluent ?

3. Enumerate the chief groups of enzymes. Give one example of each group stating its specific action and the conditions under which it exerts its maximum activity.

4. Describe with all essential details how you would prepare from natural sources specimens of any two of the following substances :—Cholesterol, Theobromine, Glycogen, Nucleic Acid, Salicin. Give the more important properties of the substances you select.

TUESDAY, OCTOBER 26th : 10 a.m. to 4.30 p.m.

1. Estimate the percentages of cane sugar and of milk sugar in the sample of Condensed Milk and ascertain the cause of the "blowing" of the tin.

2. Separate, and if possible identify, the two organisms in the given liquid.

(These exercises will be continued to-morrow, but the Candidate must describe in his notes to-day what he proposes to do.)

WEDNESDAY, OCTOBER 27th : 10 a.m. to 4.30 p.m.

1. Continue the exercises of the previous day.

2. Examine the powders (A) and (B) for the presence of maltase, and ascertain their relative activities.

THURSDAY, OCTOBER 28th : 10 a.m. to 4.30 p.m.

1. Continue the previous exercises.

2. Estimate in the given sample of Extract the total nitrogen and the nitrogen existing as amino-acids. Make such further examination of the sample as will enable you to state whether it has been prepared from meat.

(This exercise may be continued to-morrow.)

FRIDAY, OCTOBER 29th : 10 a.m. to 4.30 p.m.

1. Complete the previous exercises.

2. Make a microscopical examination of the given specimens and identify them as far as possible.

Branch (f)—Biological Chemistry. November 3rd to 7th, 1919

MONDAY, NOVEMBER 3rd : 10 a.m. to 1 p.m.

1. Write a short essay on Enzyme Action.
2. Describe methods by which the hydrogen ion concentration of two solutions can be compared and give instances illustrating the influence of hydrogen ion concentration on biochemical changes.
3. Describe as fully as you can the preparation of any TWO substances by biochemical means.
4. Give an account of the principles underlying ONE of the following processes :—
 - (a) Dialysis.
 - (b) The analysis of a mixture of carbohydrates.
 - (c) The determination of the constituent amino-acids of a protein.

TUESDAY, NOVEMBER 4th : 10 a.m. to 1 p.m.

1. Make the following observations on the sample of milk (A).
 - (i) Determine the number of organisms present per c.c. which are capable of development on nutrient agar at 25° in 48 hours.
 - (ii) Determine the number of *B. Coli Communis* present per c.c.
2. Make experiments to ascertain whether the sample of milk (B) has been heated.

WEDNESDAY, NOVEMBER 5th : 10 a.m. to 1 p.m.

1. Prepare a solution of invertase from the yeast supplied and compare its activity with that of the solution (C).

THURSDAY, NOVEMBER 6th : 10 a.m. to 1 p.m.

1. Examine and report on the cultures (D), (E), (F), and (G). Submit all stained specimens to the examiner and make drawings of the various organisms.

FRIDAY, NOVEMBER 7th : 10 a.m. to 1 p.m.

1. Estimate the percentage of available chlorine in the sample of bleaching powder (H). Ascertain what quantity of this bleaching powder must be added per litre to the water supplied (J) in order that, at the end of half an hour it may contain 1 part of available chlorine per million.

Books and their Contents.

[Books marked * have been presented by the authors or publishers, and may be seen in the Library of the Institute.]

“Cocoa and Chocolate.” A. W. Knapp. Pp. xii. & 210
(London : Chapman & Hall, Ltd.) 12s. 6d. net.

History ; cacao and its cultivation ; manufacture of cocoa and chocolate ; by-products of the industry ; composition and food value ; adulteration and the need for definitions ; bibliography.

“Chemical Theory and Calculations.” F. J. Wilson and
I. M. Heilbron. 2nd Edition. Pp. vii. & 144. (London :
Constable & Co., Ltd.) 4s. 6d. net.

“Elementary Manual of Paper Technology.” R. W. Sindall.
3rd Edition. Pp. xvi. & 337, with 13 plates. (London :
Charles Griffin & Co., Ltd.) 21s. net.

Technical difficulties ; rag papers ; esparto straw ; notes on beating ; wood pulp ; packing papers ; art papers ; physical qualities ; chemical constituents ; microscopy ; fibrous materials ; analysis ; C.B.S. units ; cellulose and its derivatives.

“Flax and its Products.” H. R. Carter. Pp. 311. (London :
John Ball, Sons and Danielsson, Ltd.) 10s. 6d. net.

Flax and its cultivation ; retting ; scutching ; hackling ; flax and tow preparing and spinning ; yarn department ; linen weaving and finishing ; linseed oil and cake and other products of flax.

“Glue, Gelatine and their Allied Products.” T. Lambert.
Pp. xii. & 153. (London : Charles Griffin & Co., Ltd.)
6s. net.

Glue ; gelatine ; size and isinglass ; treatment of effluents ; liquid and other glues ; cements, etc. ; uses ; residual products ; analyses of raw and finished products.

“ Introduction to Chemical Engineering, An.” A. F. Allen.
Pp. xvi. & 272. (London : Sir Isaac Pitman & Sons,
Ltd.) 10s. 6d. net.

Crushing and grinding machinery ; separating and mixing machinery
filtering apparatus ; driers and evaporators ; distilling apparatus
water treatment plant ; control of temperature ; transport
appendix, with tables.

“ Life and Work of Sir J. C. Bose, The.” Patrick Geddes.
Pp. xii. & 259. (London : Longmans Green & Co.)
16s. net.

* “ Manufacture of Lake Pigments from Artificial Colours, The.”
F. H. Jennison, F.I.C. Second revised edition. Pp. vi.
and 172. (London : Scott, Greenwood & Son.) 15s. net.

Classification of artificial colouring matters ; nature and manipula-
tion of artificial colours ; lake-forming bodies for acid colours ;
lake-forming bodies for basic colours ; lake bases ; principles of lake
formation ; red lakes ; orange, yellow, green, blue, violet, and black
lakes ; production of insoluble azo-colours in the form of pigments ;
general properties of lakes produced from artificial colours ; striking,
washing, filtering, and finishing ; matching and testing of lake pig-
ments ; sketch of organic combinations.

* “ Monographs on Industrial Chemistry : Cement.” By
Bertram Blount, F.I.C., assisted by W. H. Woodcock
and H. G. Gillett. Pp. xii. & 284. (London : Long-
mans, Green & Co.) 18s.

Noticed in Journal, Part II.

“ Paper Making.” Cross & Bevan. 5th Edition. Pp. 527,
with 17 plates. (London : E. & F. N. Spon, Ltd.) 30s.
net.

Cellulose ; physical structure ; diagnosis and chemical analysis ;
chemical and physical characteristics and raw materials ; special
treatment of various fibres ; bleaching ; beating ; sizing ; loading ;
colouring of paper pulp ; paper machines ; hand-made paper ;
calendering and cutting ; qualities ; testing ; general chemical
analysis ; site for paper mill.

“Paper Making and its Machinery.” T. W. Chalmers. Pp. xi. & 178, with 6 plates. (London : Constable & Co., Ltd.) 26s. net.

Cutting, cleaning and boiling ; washing, breaking and bleaching ; purifying and pulping ; beating ; refining ; Fourdrinier machine, with details ; pulp strainers ; tub sizing ; calendering, cutting and winding ; wood pulp ; coating and finishing of art paper ; coating of photographic paper.

“Report on the Quantum Theory of Spectra.” L. Silberstein. Pp. 42. (London : Adam Hilger, Ltd.) 5s. net.

“Union Textile Fabrication.” R. Beaumont. Pp. xxii. & 354. (London : Sir Isaac Pitman & Sons, Ltd.) 21s. net.

Section I. : Bi-fibred manufactures ; yarn and fabric colourisation ; textural toning ; pattern origination. Section II. : Compound yarn fabrics. Section III. : Woven unions ; looming principles ; textures light in construction ; structural schemes.

Changes in the Register.

At the meetings of the Council held in June and July, 1920, 7 new Fellows were elected; 4 Associates were elected to the Fellowship; 74 Associates were elected; and 63 Students were admitted.

The Institute has lost 1 Fellow by death.

S.=Naval, Military, or Air Service. M=Munitions. I.I.=Passed the Intermediate Examination of the Institute.

New Fellows (By Examination).

Knowles, George Edward, 37, Malvern Road, Wallasey, Cheshire.
Melville, Archibald Carswell, 50, Perth Road, Ilford, Essex.

New Fellows.

Davies, Daniel James, B.Sc. (Wales), The Government Laboratory, St. Johns, Newfoundland. [Govt. Analyst, Newfoundland Govt.]
Dixon, Prof. Harold Baily, C.B.E., M.A. (Oxon), Hon. Ph.D. (Prague), F.R.S., The University, Manchester. [Prof. of Chem. and Director of Chem. Labs., Univ. of Manchester.]
Fort, Morris, M.Sc. (Leeds), Cromwell Park Cottage, Almondbank, Perthshire. [Chief Chemist and Tech. Adviser, Messrs. Lumsden and Mackenzie; Research.]
Jones, William Jacob, D.Sc. (Manc.), 2, Lancaster Road, Fallowfield, Manchester. [S.; Senior Lecturer, Manchester Univ.; Research.]
Sand, Henry Julius Salomon, D.Sc. (Birm.), Ph.D. (Zurich), Sir John Cass Technical Institute, Jewry Street, Aldgate, London, E.C. 3. [Lecturer and Demonstrator; Research.]

Associates Elected to Fellowship.

Jephcott, Harry M.Sc. (Lond.), 121, Cambridge Gardens, London, W. 10.
Keys, William Harold, 1168, London Road, Alvaston, Derby.
McEwan, Thomas Lawson, B.Sc. (St. Andrews), Oakfield, Brampton Road, Bexley Heath, Kent.
Newman, William Alfred Cyril, B.Sc., A.R.C.S. (Lond.), A.R.S.M., Assay Office, Royal Mint, London, E. 1.

New Associates (By Examination).

- Cocks, Leslie Victor, Tara, Highfield Road, Rock Ferry, Cheshire.
 Dakers, Robert Gillies Muir, c/o Wightman, 10, Steels Place, Edinburgh,
 Greenberg, Solomon, 41, Frithville Gardens, Uxbridge Road, London,
 W. 12.
 Hollingsworth, Clifford, Brooklyn, Broomfield Road, Chadwell Heath,
 Essex.
 Morris, Edgar Archibald, 26, Etwall Street, Derby.
 Newcombe, (Miss) Vera, 17, Bloomsbury Square, London, W.C. 1.
 Potter, Alfred, 16, Nelson Street, Lower Broughton, Manchester.
 Winch, (Miss) Hope Constance Monica, 215, Elgin Avenue, Maida Vale,
 London, W. 9.

New Associates.

- Bate, Philip James, A.R.C.S. (Lond.), 4, Station Parade, Sanderstead,
 Surrey. [S.]
 Beedle, Francis Charles, B.Sc. (Bris.), 5, Clift House Road, Ashton Gate,
 Bristol. [S.]
 Bolton, Edward William, A.R.C.S. (Lond.), St. Ives, Dollis Park,
 Finchley, London, N. 3. [S.; Research.]
 Bromley, Ralph Frederic, B.Sc. (Lond.), 13, Windsor Road, Forest
 Gate, London, E. 7. [S.]
 Buck, Johannes Sybrandt, B.Sc. (Liv.), 40, Falkland Road, Egremont,
 Cheshire. [S.]
 Chaudhuri, Tarini Charan, M.A. (Calcutta), Krishnath College, Ber-
 hampur, Bengal, India. [Prof. of Chem.]
 Cheeseright, Lionel Sidney, B.Sc. (Dun.), 69, Bewick Road, Gateshead-
 on-Tyne. [S.]
 Cohen, Abraham, B.Sc. (Lond.), Cardogan House, 296, Old Ford Road,
 Victoria Park, London, E. 3. [Works Chemist.]
 Crowther, Raymond Edwin, A.M.S.T., Townscliffe, Mellor Road,
 Marple Bridge, nr. Stockport. [Research; dyes.]
 Cuckney, John, M.A. (Cantab.), Cobham, Gravesend, Kent. [S.]
 Darke, Wilfred Frederick, B.Sc. (Bris.), 10, Charlotte Street, Park
 Street, Bristol. [S.]
 Davies, Thomas Ifor, B.Sc. (Wales), Lansdowne House, Edward Henry
 Street, Rhyl. [S.]
 Dunk, Alfred James, 12, Southwold Road, Clapton, London, E. 5.
 [Finsbury Tech. Coll. Certif.; M.]
 Dunworth, James Francis, B.Sc. Tech. (Vict.), 150, Warwick Road,
 Carlisle. [S.; dyes.]
 Dunworth, Sidney William, B.Sc. Tech. (Vict.), 150, Warwick Road,
 Carlisle. [Research; dyes.]
 Ellis, Oliver Coligny de Champfleu, M.Sc. (Vict.), Chemical Dept.,
 The University, Manchester. [S.]
 Evans, (Miss) Dorothy, B.Sc. (Lond.), Longcroft, Oakerthorpe, Alfreton,
 Derby. [Research.]
 Evans, William, B.Sc. Tech. (Manc.), 35, Mitchell Street, Ancoats,
 Manchester. [Works and Research Chemist; dyes.]

- Fazackerley, Douglas James, B.Sc. (Liv.), 10, Tiber Street, Princes Park, Liverpool. [S.]
- Fowler, Alexander, M.A., B.Sc. (Glas.), c/o I. Watson, Esq., 24, Henry Street, Langholm, Dumfriesshire. [S. ; M. ; Research.]
- Garbutt, (Miss) Phyllis Louisa, Bank House, Ledbury Road, S. Croydon, Surrey. [I.I. ; Research.]
- Gibson, James, jun., Blackland Cottage, Paisley. [Royal Tech. Coll., Glasgow ; S. ; M.]
- Griffiths, William Thomas, B.Sc. (Wales), 178, Cathays Terrace, Cardiff. [S.]
- Gupta, Biraj Mohan, M.Sc. (Allahabad), 21, Cromwell Road, S. Kensington, S.W. 7. [Asst. Prof., Canning College, Lucknow.]
- Harnaman, James, A.M.S.T., 50, Canal Bank, Port Dundas, Glasgow. [S. ; M.]
- Heathcote, Brian, B.Sc. (Liv.), Dulcie Lodge, Riversdale Road, Aigburth, Liverpool. [S.]
- Hellings, William, B.Sc. (Wales), 5, Mill Street, Ystrad-Rhondda, Glam. [S.]
- Henderson, Henry Willie Caird, A.R.C.S. (Lond.), 34, Barrowgate Road, Chiswick, London, W. 4. [War relief work.]
- Heyes, Thomas Francis, B.Sc. (Liv.), 12, Appleton Village, Widnes, Lanes. [S.]
- Hunter, Harold, B.Sc. (Lond.), 213, Strone Road, Manor Park, London, E. 12. [S. ; M. ; Research.]
- Ison, (Miss) Edith Margaret, B.Sc. (Lond.), 26, North Road, West Bridgford, Nottingham. [Drugs.]
- James, Frank, B.Sc. (Birm.), 25, St. Paul's Road, Balsall Heath, Birmingham. [S.]
- Kingan, Robert, Camerton House, Gomeldon, nr. Salisbury. [Liverpool Univ. and Tech. School ; S. ; Research.]
- Kon, George Armand Robert, M.A. (Cantab.), D.I.C., 22, Eaton Mansions, Cliveden Place, London, S.W. 1. [S. ; Research.]
- Marshall, James Currie, jun., B.Sc. (Glas.), Corsehillbank, Crosstobs Barrhead, Glasgow. [S.]
- Maurice, Norman Brocklehurst, M.Sc. Tech. (Manc.), College of Technology, Manchester. [Research ; S.]
- Mellor, Joseph Crosland, B.Sc. (Edin.), 6, Queen's Terrace, S. Clarence Road, Longsight, Manchester. [S. ; dyes.]
- Middleton, Geoffrey, B.Sc. (Lond.), 80, Woodgrange Road, Forest Gate, London, E. 7. [S.]
- Nicklin, George Norman, M.A. (Cantab.), 9, Willis Road, Cambridge. [S.]
- Ollard, Eric Alexander, A.R.C.S. (Lond.), 15, Bedford Row, London, W.C. 1. [S.]
- Pawsey, (Miss) Edith Hilda, B.Sc. (Lond.), Chemical Department, South Metropolitan Gas Co., 709, Old Kent Road, London, S.E. [Research ; Gas.]
- Penn, (Miss) Emily Beatrice, B.Sc. (Lond.), 146, Jamaica Road, London, S.E. 16. [Govt. Lab.]
- Price, James Ernest Bartlett, B.Sc. (Lond.), 131, Alexandra Road, Wimbledon, London, S.W. 19. [S.]

- Ruddock, Frederick Amory, R.N. College, Greenwich, London, S.E. 10.
[Sheffield Univ. and Univ. Coll., Cardiff; S.]
- Sanderson, William James, B.Sc. (Vict.), 9, Cranworth Street,
Stalybridge, Cheshire. [S.; M.]
- Scarlett, (Miss) Olive Worth, B.Sc. (Edin.), 204, Newhaven Road,
Leith. [Demonstrator, Edin. Univ.]
- Seaton, William Dunham, R.E. Experimental Station, Porton, Salisbury.
[S.]
- Shiels, Douglas Oswald, M.Sc. (Melbourne), c/o Agent General for
Victoria, Australia House, Strand, London, W.C. 2. [S.]
- Shulman, Isaac, M.Sc. (Leeds), 75, Reginald Terrace, Chapelton,
Leeds. [Works Chemist.]
- Slack, Harry, D.C.M., B.Sc. (Vict.), 26, Mahood Street, Stockport.
[S.; M.; Research.]
- Srivastava, Jwala Prasad, M.Sc. Tech. (Vict.), A.M.S.T., Civil Lines,
Cawnpore, India. [Industrial Chemist.]
- Stephen, Alexander Charles, B.Sc. (Aberdeen), The Manse, Garvock,
Laurencekirk, Scotland. [S.]
- Stott, George Herbert, B.Sc. (Liv.), 16, Lynwood Road, Rice Lane,
Liverpool. [S.]
- Strachan, James Thallon, Bogalusa Pulp and Paper Co., Inc., Bogalusa,
La., U.S.A. [Heriot-Watt College, Edinburgh; Paper Works
Chemist; over 12 years' experience; patent.]
- Tait, Leonard, B.Sc. (Glas.), Applegarth, Albert Drive, Pollokshields,
Glasgow. [S.]
- Taylor, Albert, B.Sc. (Vict.), North View, Buxton Road, Disley,
Cheshire. [Dyes.]
- Taylor, Cyril Bertram, A.R.C.S. (Lond.), Westfield Cottage, Woking
Surrey. [S.]
- Thomson, James Simpson, M.A., B.Sc. (Aberd.), Station House, Bield-
side, Aberdeen. [M.]
- Tomkinson, (Miss) Margaret Grosvenor, Franche Hall, Kidderminster.
[Nat. Sci. Tripos, Cambridge; Asst. Lecturer, Girton Coll.]
- Walmsley, James Rawson, A.M.C.T., Dean Brook Cottage, Dean Lane,
Moston, Manchester. [7 years' experience.]
- Whelan, Peter, A.R.C.S.I., 11, Fair Hill, Cork, Ireland. [Demon-
strator, R.C.S.I.]
- Wilford, Arthur Thomas, B.Sc., A.R.C.S., (Lond.), 102, Denmark Road,
London, S.E. 5. [S.]
- Wilkinson, John Frederick, B.Sc. (Vict.), Holmwood, Davenport Park,
Stockport. [S.]
- Wood, (Miss) Florence Mary, B.Sc. (Lond. and Birm.), Belgrave House,
6/7, Montague Street, London, W.C. 1. [Research.]
- Wood, Robert, B.Sc. (Dun.), 2, Linden Terrace, Gloucester Street,
Newcastle-on-Tyne. [S.]
- Youll, John William Reginald, Keswick, Rainsford Avenue, Chelms-
ford. [Finsbury Tech. Coll. Certif.]

New Students.

- Adcock, Roland Eric, 69, High Street, Syston, Leicester.
- Bailey, Robert Arthur, 4, Warton Street, Bootle, Liverpool.

- Baird, James, 1, Arran View, Beith, Ayrshire.
 Balfour, Robert Paterson, 4, Forbes Terrace, Kirkcaldy, Fifeshire.
 Barnes, Alfred Raymond, 167, Middle Furlong Road, Meadows, Nottingham.
 Best, John Kenneth, 8, Sycamore Road, Bournville, Birmingham.
 Bilton, Ralph Moulton, Sizer Hill, Yeadon, Leeds.
 Booth, Walter, Brookdale, Ferrybridge, Yorks.
 Budgen, Norman Frederick, Southbourne, Birchfield Road, Handsworth, Birmingham.
 Butler, Edwin Harold, 26, St. James Road, Leicester.
 Carmichael, Kenneth Francis, Fetteresk, Penicuik, Midlothian.
 Catton, Eric Draycott, Beeston, Swaffham, Norfolk.
 Chilvers, Percy Monkman, 53, Caledon Road, Sherwood, Nottingham.
 Clatworthy, (Miss) Joan Catherine, 6, Beverley Road, Highams Park, Chingford, London, E. 4.
 Coburn, Andrew, Pumphreston, Mid-Calder.
 Coucher, (Miss) Amy Gladys, 2, St. John's Wood Road, London, N.W. 8.
 Crombie, John James, 94, Polwarth Gardens, Edinburgh.
 Cutting, Cecil George, St. Hilda's, 47, Whitehall Park, London, N. 19.
 Davies, John Edward, 106, Gordon Road, West Ealing, London, W. 13.
 Dee, Thomas Pride, 17, Ratcliffe Road, Loughborough.
 Drabble, Arthur Garnet, 13, Stemp Street, Sharrow, Sheffield.
 Frankenburg, William Eric, 78, Goldhurst Terrace, Hampstead, London, N.W. 6.
 Fraser, Bertram Turner, 23, Restabrig Terrace, Leith.
 Grant, Reginald Lindsay, Church Villa, Northenden, Cheshire.
 Gregory, Louis Wilfred, 273, Woodborough Road, Nottingham.
 Harper, Hugh, 7, Meadowbank Terrace, Edinburgh.
 Houlihan, John Ernest, 38, Park Road, Plumstead, London, S.E. 18.
 Jenkinson, Thomas Alfred, 5, Glebe Street, Marsh, Huddersfield.
 Johnston, George, 80, Balgreen Road, Murrayfield, Edinburgh, W.
 Kay, Lohn Loudon, 39, Heugh Street, Falkirk, Scotland.
 Lacamp, Auguste Leonard Bernard, St. Louis, Marlborough Grove, York.
 Laing, Alexander George, 30, Murrayfield Avenue, Edinburgh.
 Laing, John Barclay, Railway Hotel, Haddington, Scotland.
 Lee, William Joseph, 23, Well Close Terrace, Leeds.
 Lohn, Clarence Edward, 79, Clova Road, Forest Gate, London, E. 7.
 Mair, John Alexander, 52, Holmhead Street, Glasgow.
 Meacock, Harold Robert, 103, St. Leonard's Road, Northampton.
 Morgan, Frank Ewen, 6, Pavilion Parade, Brighton.
 Murray, Alexander Frederick, 3, Barns Park, Ayr, Scotland.
 Palmer, Neil, The Grasshopper, Westerham, Kent.
 Prowse, William Elliott Ashfield, Kingsbridge, S. Devon.
 Radford, William Howard, Westwood, Shobnall, Burton-on-Trent.
 Rice, Frederick, Carisbrook House, Fitzwilliam Street, West, Huddersfield.
 Rider, Harold Baty, 81, Atherley Road, Southampton.
 Robb, William, 11, Glenview, Paisley, Scotland.
 Russell, William Lyle, Academy House, Berwick-on-Tweed.

- St. Claire, Gerald, c/o Messrs. The Magadi Soda Co., Ltd., Lake Magadi,
British East Africa.
- Scott, Robert, 12, Balsusney Road, Kirkcaldy, Fife.
- Smith, Harry, 2, Federation Road, Abbey Wood, London, S.E. 2.
- Smith, Walter, 69, Montpelier Park, Edinburgh.
- Snell, Arnold Arthur Hony, 17, Dangan Road, Wanstead, London, E.11.
- Southall, Colin Lambert, 39, Gough Road, Edgbaston, Birmingham.
- Sowter, Frederick Archibald, 30, Nelson Street, London Road, Leicester.
- Spicer, George William, 204, Wellingborough Road, Rushden,
Northamptonshire.
- Stuart, Leslie Donald, 147, Breakspears Road, Brockley, London, S.E.4.
- Sword, James, Smith Institute, Stirling.
- Thorn, Stanley Charles Hammond, 44, Castelnau, Barnes, London,
S.W. 13.
- Wall, William, 111, Berridge Road, Sherwood Rise, Nottingham.
- Waygood, William Arthur, 134, Braidwood Road, Catford, London,
S.E. 6.
- Westrip, George Meredyth, Palmyra, Portsmouth Road, Surbiton,
Surrey.
- Wilson, George Edward, 16, Caledonian Road, Edinburgh.
- Wilson, John Norman, 30, Spottiswoode Street, Edinburgh.
- Woods, Norman Edward, Rangiora, 20, Arthur Road, Wimbledon
Park, London, S.W. 19.

DEATH.

Fellow.

Arthur Wingham.

General Notices.

Examination.—An Examination in Biological Chemistry, Bacteriology, Fermentation, and Enzyme Action will be held during the week commencing Monday, 25th October. This examination is open to any Fellow or Associate, and to any Candidate whose application for admission to the Examination has been accepted by the Council. The examination extends over at least four days, and may be theoretical and practical, written and oral. The syllabus includes Biological Chemistry, Bacteriology, Fermentation, and Enzyme Action with special reference to the Chemistry and Bacteriology of Food-Stuffs, Water Supply, and Sewage Disposal, and the application of Biological Chemistry to Industries and Manufactures.

Candidates who desire to be examined in this Branch should notify the Registrar before Monday, 13th September, 1920.

Notice to Associates.—Associates elected prior to August, 1917, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain forms of application for election to the Fellowship.

Appointments Register.—A Register of Fellows and Associates of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

The Library.—The Library is open for the use of Fellows, Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays : 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is also available for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 A.M. to 9 P.M. on week-days : (Saturdays from 10 A.M. to 5 P.M.)

Changes of Address.—In view of the expense involved through frequent alterations of addressograph plates, etc., Fellows, Associates, and Students notifying changes of address are requested, to give as far as possible, their *permanent* addresses for registration.

Additional Privileges of Registered Students.—Any Registered Student in the last term of his college course who desires to make preliminary arrangements with a view to obtaining an appointment may receive the Appointments Register of the Institute on the same terms as Fellows and Associates provided that his application for this privilege be endorsed by his Professor.

THE
INSTITUTE OF CHEMISTRY
OF
GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.

1920.

PART V.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER,
Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.
October, 1920.

Publications Committee, 1920-21.

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Editorial.

REGISTER OF CHEMICAL ASSISTANTS.

As indicated in Parts III. and IV., the Council have considered the question of the employment and the training of Chemical Assistants.

The Institute maintains a Register of such Assistants who have passed approved Preliminary Examinations, and in some cases Intermediate Science Examinations. These youths are capable of doing useful laboratory work and are seeking positions, at a living wage, while preparing by evening classes to obtain a qualification. In this connection the Institute is associated with a Committee of the Ministry of Labour, Employment Department, in co-operation with the Incorporated Association of Headmasters.

While the Council consider it desirable that all who intend to practise the profession of chemistry should attend a systematic day course of training at a recognised college, they know that in many cases this is impossible. Chemistry is now taught as a regular class subject in most secondary schools, and many boys are anxious to take up work involving the application of the science ; but few can win scholarships, and the parents of the others cannot in many cases afford to support them and to pay their college fees. At the same time, many simple routine chemical operations can be performed by well-educated youths after a little training and, in most laboratories, there is a demand for chemical assistants. The Council are anxious, however, that these youths shall not be led into a " blind alley " occupation, and shall not become mere craftsmen, adepts in one or two operations, who by styling themselves chemists are liable to give rise to a mistaken impression of the qualifications required for the profession.

Having these considerations in view, the Council have formulated a more definite scheme for keeping a Register of Chemical Assistants, and they ask Fellows and Associates to take their part in ensuring its success. They trust, moreover, that Members, when appointing Chemical Assistants, will bear in mind the following considerations :—

- (a) Candidates, without exception, should have matriculated or have passed some other approved preliminary examination.
- (b) They should only be appointed if their parents are unable to provide for their taking a day course of training at a recognised University or College.
- (c) They should receive advances in wages in proportion as they show assiduity in prosecuting their evening studies as well as in making good progress in their employments.
- (d) They should be transferred early to other vocations if they do not show an aptitude for chemical work.

Already considerable response has been received from Fellows in charge of laboratories of many important and influential industrial concerns who are prepared to adopt the proposals set forth above ; and their co-operation, in turn, is awakening among some of those Technical Colleges which are not yet formally recognised by the Council of the Institute a desire to provide systematic courses to enable the junior members of works chemical staffs to prepare for Degrees and for the Associateship of the Institute.

In several instances, the head chemists are in direct touch with the teachers in the institutions, and the courses have been arranged on lines and at times mutually agreed upon.

The directors of several concerns where junior staffs are recruited systematically, in many instances under articles, have undertaken to allow assistants to leave work in time to attend classes, to pay fares and college or examination fees, or to remit them, or to make awards sufficient to cover all expenses, including the cost of text-books, when satisfactory

evidence is produced of attendance and of passing the class examinations.

The chemists of such concerns naturally afford instruction in the particular work required in their laboratories; but under the above arrangement they take care to inquire into the general progress made by their assistants, not only in chemistry, but in other subjects—especially physics, mathematics, and languages—required by the universities and the Institute. Assistants who profit by the help thus afforded them and obtain recognised qualifications are promoted to the permanent technical staffs, with corresponding emoluments and conditions of appointment.

The advantages to the employers are abundantly clear since they have not only the satisfaction of helping their employees and thereby securing their services with a greater prospect of permanency, but they provide themselves with definite grounds for dispensing with the services of any assistants who do not fulfil their part of the agreement, thus evading the old system under which a proportion, at least, of their laboratory staffs were engaged in a “blind alley” occupation. One or two companies have found that the assistants recruited under the above or a similar scheme are specially suited for plant control, rather than for higher laboratory work; but no generalisation on this point should be allowed to interfere with the disposal of each assistant according to his individual merits.

The Institute's Register of Chemical Assistants contains only the names of youths who have complied with condition (a) above, whose parents, moreover, have given a written statement that the youths are of necessity precluded from undergoing a systematic four years' day course at a recognised college, and have given an undertaking that they shall attend an approved evening course of study with a view to obtaining a qualification. Provision is also made that when a youth has once secured a post through the agency of the Register, he will not be allowed the further use of the Register except on the production of satisfactory certificates of the work he

has done in the intervening period. In this way youths who are unlikely to qualify will be dissuaded from pursuing a career in chemistry before they have reached such an age that it is difficult for them to adopt another vocation.

The Register is divided into three grades :—

Grade A. Youths who have passed an approved preliminary examination.

„ B. Youths who have also satisfactorily completed studies of the standard of a first year University course.

„ C. Youths who have also satisfactorily completed studies of the standard of a second year University course.

Fellows and Associates and employers who have vacancies to offer such Chemical Assistants are asked, in the first instance, to communicate with the Registrar indicating the grade required. They will thus assist in establishing on a definite footing a Register of Chemical Assistants, who should in all cases be encouraged to register as Students of the Institute with the intention of qualifying for the Associateship and Fellowship.

The Council, having made provision for the admission of all suitable candidates to the membership, are unable, to concern themselves with those who neglect the many opportunities afforded them for obtaining an adequate training. They hope, therefore, by the means above indicated, to avoid the further creation of a body of partially qualified men.

SCIENTIFIC AND INDUSTRIAL RESEARCH

In this part a brief summary is given of the Report of the Committee of the Privy Council for Scientific and Industrial Research. A few points of interest to chemists call for special mention. The Advisory Council, in their Report to the Committee have made their position much clearer in regard to individual research workers not engaged on any specific industrial problem. “No conditions are attached

to the grants made to workers whose sole aim is the extension of knowledge, either as to the line of their work or as to the use to be made of the results. If they propose to make commercial use of their discoveries we require them to consult us, because at this point they are leaving the field of pure investigation."

A fairer statement could not be expected; it should do much to remove the doubts that have often been felt on this point. In the Report for 1919-20, p. 85, it was stated that "only in exceptional cases in which results of commercial value were expected or obtained is it desirable to limit the freedom of publication of results of researches carried out with the aid of public funds."

It appears now, however, that if a research worker wishes to publish his results in the usual scientific journals and not to make commercial use of his discoveries, but to give them to the world, he is at liberty to do so.

Another sentence in the Report which calls for comment is—"The new research associations . . . are finding it difficult to secure scientific staffs of the necessary ability." There has always been a shortage of research workers in this country, largely due to an educational system which grants a degree to a student at what is but the foundation, and not, as is generally supposed, the conclusion of his scientific education. The present boom in research has caused keen competition for the best men, and the research associations do not appear to have offered sufficient inducement, more particularly to the younger men. A suggestion was made at the Conference of Research Associations held recently that £400 per annum was a reasonable salary for a graduate with two or three years' research experience. The position of the Associations and of their workers when Government aid is no longer forthcoming in five years' time is uncertain. The research worker has to assign to the association all rights in any discovery he may make, and has little prospect of publishing his work and thus gaining the recognition of his fellows. Such a salary and with such uncertain prospects is not sufficiently

tempting compared with those attaching to permanent posts in Government research departments and industrial concerns.

A system of royalties to individuals for discoveries in a research department which will be satisfactory to the best interests of efficiency and good team work has yet to be discovered ; but it is felt that the Department of Scientific and Industrial Research should use its influence fully to secure for the research worker the certainty of an adequate salary. It may be argued that salaries will improve when results are obtained. For the realisation of that desideratum the research worker has to rely on the generosity of the firms concerned in the research association to which he is attached. The experience of pre-war times has shown that this argument is at best a poor one. Those who are working under the research associations are asked to give their services for five years at moderate salaries in the hope of securing better remuneration in the future. The research associations are at present heavily financed by public funds, and research workers look to the department to repudiate the bad example of pre-war days.

An Inter-departmental Committee is to be formed to consider the question of rights in inventions made by workers aided or maintained from public funds. This apparently covers inventions by individual research workers aided by the Department and by service men and Government employees, but not those by the research workers in the Research Associations. As long as these Associations are aided by public funds there appears to be no justification for this omission. The suggestion that the firms concerned in the Associations resent interference is not likely to enhance the research workers' opinions of their prospects.

Proceedings of the Council

(August—September, 1920.)

Chemical Engineering Standards.—The Committee of the Chemical Engineering Group of the Society of Chemical Industry has represented to the Council of that Society the urgent importance of dealing with the standardisation, on a wide and comprehensive basis, of such plant and apparatus employed in chemical industries as can advantageously be standardised. The Society, with the concurrence of the Association of British Chemical Manufacturers, having approached the British Engineering Standards Association on the matter, a Conference was held at the Institution of Civil Engineers on 21st July to ascertain whether opinion was favourable to the proposed work being undertaken and to consider the formation of a Sectional Chemical Engineering Committee to give effect to the policy.

The Council of the Institute having been invited to appoint representatives to take part in the Conference, Mr. Horatio Ballantyne and Sir Robert Robertson, Vice-Presidents, and Mr. William Macnab attended, and in due course reported on the proceedings. The Council subsequently concurred in the appointment of the Sectional Committee, but with regard to a suggestion that the proposed Committee should have within its purview the standardising of methods (including analytical and other chemical methods) of testing the materials used for chemical plant, and the materials used in its construction, the Council expressed the opinion that the methods adopted would be most likely to meet with the general acceptance needed to render them effective if they were prescribed and approved by fully qualified chemists. The Council, therefore, urged that

in all cases where analytical or other chemical matters came under consideration, the proposed Committee should include representatives of the Institute of Chemistry and the Society of Public Analysts. The Council also stated that they would be prepared to co-operate by nominating members having specialised knowledge of such chemical matters, and would, if the main Committee adopted this suggestion, do all in their power to ensure the success of the scheme. Further, the Council welcomed this opportunity for chemists, engineers, and chemical engineers to meet on common ground for their mutual support and the benefit of industry.

British Laboratory Glassware.—Arising from negotiations with the Government Departments concerned, the following letter has now been forwarded to users of laboratory glassware, in the hope that the production of such ware may not be discontinued in this country :—

September, 1920.

DEAR SIR,—

British Laboratory Glassware.

The Institute of Chemistry has been in conference with the Department of Scientific and Industrial Research with regard to the supply and quality of British laboratory glassware.

You are probably aware that endeavours were made during the war to establish this branch of industry in order to render Great Britain independent of foreign supplies. A number of well-known firms turned their attention to the manufacture, but although it is now possible to obtain satisfactory British laboratory glassware, complaints have been received with regard both to inconsistency in quality and to the shortness of supplies of certain forms of apparatus.

The Glass Research Committee of the Institute, appointed to watch these matters in the interests of chemists, has reason to believe that complaints with regard to the quality of laboratory glassware are directed mainly against unmarked ware. Since it is difficult for the Committee to trace the origin of unmarked ware and thereby to offer their assistance with a view to correcting faulty technique, the Committee has agreed, with the concurrence of the Department of Scientific and Industrial Research, the Board of Education, and the Board of Trade, to issue this letter to the heads of Chemical Departments in Universities and Colleges, to the teachers in Public and Secondary Schools, and to users of laboratory ware generally, urging them to purchase only ware of British make, bearing the distinctive marks of the manufacturers. The Glass Research Committee has recommended British manufacturers to place their distinctive marks upon their laboratory glass ware, and, in the case of small articles, such as test

tubes packed in corrugated cardboard boxes, to seal such boxes with adhesive labels bearing similar distinctive marks. It is hoped that, by refusing to accept unmarked glassware, the users will assist in raising the general level of quality.

The Glass Research Committee will continue to assist, so far as they are able, in investigating complaints with regard to marked laboratory glassware.—Yours faithfully,

RICHARD B. PILCHER,

Registrar and Secretary.

Research Chemicals.—The Association of British Chemical Manufacturers look to the continued support of research workers to enable them to continue and extend the production of fine chemicals for research purposes.

A list of substances prepared by members of the Association has been published and widely circulated. Enquiries should be addressed to the Secretary, Association of British Chemical Manufacturers, 166, Piccadilly, London, W.1. Pending the more extensive production of research chemicals. Fellows and Associates who experience difficulty in obtaining special substances, not obtainable through the Association, are invited to notify the Registrar of the Institute in order that endeavours may be made to obtain supplies from other chemists who have them in stock. The Institute has already been able to render this assistance to several chemists.

Lecture.—Fellows, Associates, and Registered Students are invited to a Lecture on "Some scientific aspects of Tanning," to be delivered by Mr. John Turney Wood, F.I.C., of Messrs. Turney Bros., Ltd., Nottingham, in the Chemical Theatre at University College, Gower Street, London, W.C., by kind permission of the Authorities of the College, on Wednesday, the 24th day of November, at 8 p.m.

The Lectures Committee has had under preliminary consideration the feasibility of arranging public lectures with a view to popularising chemistry and its practical applications. The Committee suggest, that Fellows and Associates who are members of local scientific and literary societies should partake in such a scheme in the interests of their profession, having in mind the importance of creating and maintaining a more

lively general interest in scientific matters. The Local Sections have been asked to co-operate in the general movement by allowing their members to invite friends to lectures when the subjects submitted for discussion are not of a highly technical or purely professional nature. The Committee also suggests that chemists engaged in industries should take advantage of any suitable opportunity that may occur to them of bringing to the notice of workers the advantages to themselves and to the community arising from chemical inventions, and of illustrating the principles underlying their everyday operations.

War Office Chemists.—At the invitation of the Army Council, the President of the Institute has nominated Mr. Horatio Ballantyne, Vice-President, to serve, as representative of the Institute, on a Committee appointed to enquire into the status and functions of the Directorate of Chemical Inspection, Royal Arsenal, Woolwich.

Remuneration of Chemists.—Fellows and Associates holding whole-time appointments, who have not yet returned the schedules issued with Part IV. are invited to forward them to the Registrar as soon as possible, in order that statistics and a summary of the present economic position of chemists may be prepared for publication in Part VI. The numbers of returns received up to October were: from Fellows 115, from Associates 390. The number received in 1919 was over 900. Local Sections are requested to encourage members to assist the Council in this matter in the interest of the profession. In order that useful statistics may be prepared for publication in the next Part of the Journal, the Council request that all returns be forwarded to the Institute before 30th November. Further copies of the form are being issued for the use of members who have not already made a return.

Appointments Register.—The Appointments Register of the Institute continues in very active operation, the demand for chemists for responsible appointments being well maintained.

Scientific and Industrial Research.

THE Fifth Report of the Committee of the Privy Council for Scientific and Industrial Research (Cmd. 905) has been published by H.M. Stationery Office, and a copy has been received at the Institute. The Committee is now concerned with the organisation of all scientific work which is of common interest to the fighting services of the Crown, in order to ensure economy of expense and personnel and the due co-ordination of the technical work of naval, military, and aeronautical establishments, and to avoid their overlapping with one another or with the research organisations of civil departments. Boards for Chemistry, Engineering, Physics and Radiography, including technical representatives of the fighting services and civilian departments, and independent men of science, have been appointed for the work of co-ordination, the cost of all research of a fundamental character to be borne by the Department. At the request of the Ministry of Health a Board has also been formed for Building Research. The Geological Survey and Museum of Practical Geology has been transferred to the Department, and a Geological Survey Board has been appointed to direct their operations. Reference is made to the progress of the work undertaken by the Fuel Research Board, the National Physical Laboratory, the Food Investigation Board and the Tin and Tungsten Research Board. The number of industrial research associations has been increased to eighteen; the grants made to these associations up to 30th June last amounted to £45,129 7s. 6d. The capital then in hand was £954,870 12s. 6d., and the Trustees were committed to further grants to associations estimated at nearly £400,000.

The Report of the Advisory Council is attached to that of the Committee. Their programme of work is summarised

under four main heads : “ (1) The encouragement of the individual research worker, particularly in pure science ; (2) the organisation of national industries into co-operative research associations ; (3) the direction and co-ordination of research for national purposes ; and (4) the aiding of suitable researches undertaken by scientific and professional societies and organisations.” The progress of work under each of these heads is briefly reviewed. In the first place the scarcity of research workers is deplored : “ The present and the impending shortage of research workers has from the beginning been the source of constant anxiety in the formulation of all our plans.”

The Advisory Council confirm the impression, which has also been gained through the working of the Appointments Register of the Institute, that industries are showing an awakening interest in the value of research and of scientific control. It is hoped that with the largely increased number of students now in training in the universities and colleges there is an early prospect of the number of research workers being augmented.

The Report proceeds to deal with the grants made to students and independent workers, and the conditions governing their award, which aim at assisting promising workers as well as promising lines of enquiry, with the reservation that workers who propose to make commercial use of their discoveries are required to consult the department because at that point they are leaving the field of pure investigation.

The Report of the Advisory Council, which is dated 2nd August, 1920, supplies more recent information than that of the Committee, with regard to the research associations. Five additional associations will shortly receive licences from the Board of Trade ; grants have been made to the sum of £63,800 ; the Department has increased its prospective commitments to approximately £570,000, and, in anticipation of the formation of other associations, expects them shortly to reach £800,000.

Under "The conduct and co-ordination of national research," the Advisory Council recognise that provision must be made for dealing with certain fundamental problems of wide application in industry, such as that of fuel.

The Fuel Research Board, under the directorship of Sir George Beilby, has made provision for the examination of the more important types of coal from all parts of the United Kingdom and their classification according to their suitability for the production of gaseous, liquid and solid forms of fuel by various systems of carbonisation and gasification. Data are being obtained for the use of technical experts and manufacturers who are seeking to replace crude methods of using coal by more efficient and economical methods. The inquiries of the Board are also directed to the adoption of more economical gas production and to the utilisation of peat as a source of fuel. A Peat Enquiry Committee has been appointed and experimental work on machine-cutting and the winning of peat has been in progress during the past eighteen months. Modern systems for the use of pulverised coal have been investigated, and a Report on "Pulverised Coal Systems in America" by Mr. Leonard C. Harvey, has been published by H.M. Stationery Office. Sir Frederick Nathan has been appointed Power Alcohol Investigation Officer, dealing with problems of the production and utilisation of alcohol for power and traction purposes. The Fuel Research Board has been in collaboration on technical matters with the Admiralty, the Ministry of Munitions, the South African Government, and the Ministry of Health, and has co-operated with the Advisory Committee of the Meteorological Office, on Atmospheric Pollution and with the Smoke Prevention Committee of the Ministry of Health, with regard to air pollution by smoke and dust from domestic fires, factories, and power stations, and the possibilities of legislative action on this matter.

At the request of the Board of Agriculture and the Ministry of Food, the Department has also undertaken to investigate the problems of the preservation and the prevention of waste of food, especially the waste occurring between

production and distribution, affecting questions of cold storage and methods of preserving and handling fish, meat, fruit, and vegetables. The Food Investigation Board controls a series of biochemical and biophysical researches into the changes which take place in mammals, birds and fish after death and in the living tissues of fruit in the process of ripening. A low temperature station is to be built and equipped at Cambridge to foster the development of this work.

A Board has also been constituted to control research into building materials and methods of construction, covering a wide field for investigation into materials which, before the war, in England and Wales alone, involved a sum of £35,000,000 a year.

The work of the National Physical Laboratory, now under the Directorship of Sir Joseph Petavel, also comes under brief review, with special reference to investigations of a very varied character carried out for Government Departments, reported in fuller detail in the Report of the Executive Committee of the Laboratory, which is published separately.

During the first five years of the existence of the Research Department grants amounting to £68,816 have been made to 32 societies and organisations ; in some cases the investigations undertaken have been transferred to the appropriate research associations as they were formed. In a brief summary of results achieved, the Advisory Council acknowledge again the work of the Institute of Chemistry on laboratory and optical glass which " has had a large share in putting the production of these vital necessities on a sound basis."

Mention is also made of the special grants to the Stoke-on-Trent School of Science and Technology for work on hard porcelain ; to the University of Sheffield, for glass technology, and to the Imperial College of Science and Technology, for technical optics.

The remainder of the Report is formulated in three Parts :

" Part I. describes the progress made in the establishment of research associations during the past year, and discusses certain problems which their activities are bringing into prominence.

Part II. deals with the organisation of research for national purposes during the same period. We refer in this part of our report to departmental publications which have appeared or are in preparation, and to the organisation of research in the Dominions beyond the seas.

Part III. describes the more important developments that have taken place since the last report in the conduct of researches initiated by other bodies and aided by grants from the Department."

A Records Bureau has been established, under the charge of Dr. C. R. Young, the main object being to secure economy by preventing repetition and overlapping of investigations and by ensuring that the fullest possible use is made of the results of research. The Bureau should be of service in examining the programmes of research associations in order to ensure that researches are not unconsciously duplicated by different associations ; or that where two or more associations may be interested in the same problem, from different points of view, arrangements may be made for a concerted attack and for sharing the general results.

The Report also refers to research for the Empire in respect of the conditions of life for Europeans in tropical countries, and to developments in the organisation of research in industries, such as cotton growing, flax growing, and the production of various raw materials.

In Part III., dealing with grants made to institutions in aid of research, special mention is made of research into the production of a hard porcelain from British materials. Recipes for the body and glaze were applied for by over fifty firms, but the production has not yet been undertaken, except on a semi-manufacturing scale. "The work has been extended to high temperature porcelain typified by chemical ware, but the investigation is not yet sufficiently advanced to justify any positive statements being made." Grants made to individual research workers and students for the academic year 1920-21 amount to £45,000. These grants are to be regarded as supplementary to the assistance for education and research, which is given to universities under the Treasury grants included in the Civil Service Estimates.

"They include no personal payments to professors and lecturers in the various universities, though we consider that it lies properly within our function to assist the personal research work of these men by providing them with research assistants." Our intention in doing so is to enable them to increase their output of scientific work by relieving them of the more routine work which can be effectively done for them by investigators working under their supervision. We have also made grants to research workers of proved attainments in universities and colleges who hold no regular staff appointment. Our grants do not constitute the sole source of income of many of these research workers. A number of them undertake, with our concurrence, a limited amount of teaching work, and we consider that the association of research with some teaching of university grade tends to the benefit of research work."

The "aim in recommending these grants is the encouragement of research with a view to the increase of existing knowledge. Only in exceptional cases in which results of commercial value are expected or obtained is it desirable to limit the freedom of publication of results of researches carried out with the aid of public funds . . . except in these special cases, it should be open to a research worker receiving a grant from the Department to publish the results of research from time to time as he thinks fit . . . out of 159 grants made during the current academic year, it has only been thought necessary to restrict the freedom of publication in 22 cases."

The Advisory Council have adopted the view that "the research in which a student should engage ought, as a rule, to be a subject primarily of scientific interest, and that a topic which aims at results of commercial value should only be accepted when we are satisfied that in the hands of the recommending professor it will afford the most suitable means of training a student. . . . While we are anxious to encourage the co-operation of scientific staffs of universities and technical colleges with those engaged in industry in the conduct of research having an industrial bearing, we have laid it down that we are not prepared to recommend grants to research workers to enable them to undertake specific investigations proposed by industrial firms unless it is made clear that the acceptance of a grant from the Department will preclude the firm from obtaining any exclusive use of the results."

An Inter-Departmental Committee is to be appointed with the following terms of reference :

- "(1) To consider the methods of dealing with inventions made by workers aided or maintained from public funds, whether such workers be engaged (a) as research workers, or (b) in some other technical capacity, so as to give a fair reward to the inventor and thus encourage further effort to secure the utilisation in industry of suitable inventions and to protect the national interest; and
- (2) To outline a course of procedure in respect of inventions arising out of State-aided or supported work which shall further these aims and be suitable for adoption by all Government Departments concerned."

Finally, the Advisory Council refer to applications which they have received from scientific societies for grants to meet the increased cost of their publications. While "fully sensible of the danger to scientific research which must result from a limitation of the facilities for publication," they have not found it possible to provide assistance in the way proposed, or to recommend a grant for the purpose without any estimate of the cost to public funds. Difficulty is suggested in arriving at the amount of such grants by reason of the fact that the publications are sold, possibly at a profit. "A grant which reduced the sale price of scientific publications below the cost of production, would in effect be a grant for the assistance of a particular section of the community, and, as a permanent arrangement, would be at least as difficult to defend as other trade subsidies."

The Advisory Council state, however, that they would "welcome common action by the scientific societies in the formulation of a policy for dealing with the present difficulties. If the societies were to make a considered review of the whole of their circumstances, it would at least be possible for them to submit for the consideration of the Government a definite statement of the extent to which the national interest is prejudiced by the present increase in the cost of printing."

Many Fellows of the Institute are serving as members of Research Boards and Committees of the Department. It is to be hoped, however, that the work of the Food Investigation Board will embrace more strictly chemical aspects, as well as physiological, and that some representative public analysts will then be associated with the Board in this field of investigation.

Local Sections.

The majority of the Local Sections have suspended their activities during the summer months, but they are now resuming their meetings.

Irish Section.—The Annual General Meeting will be held on Friday, November 19th, at 4.15 p.m., in the Royal College of Science, Dublin.

Liverpool Section.—A Fellow who has recently moved to Liverpool, in expressing his appreciation of the kindly welcome extended to him by the Local Section, has remarked on the value of its work and the keen interest taken by its members in the professional matters submitted for discussion.

Personal.

Sir James Dobbie (Past President of the Institute) has retired from the position of Government Chemist.

Dr. Victor John Harding has been appointed Professor of Chemical Pathology in the University of Toronto.

Dr. T. Lewis Bailey has been appointed Chief Inspector under the Alkali, etc., Works Regulation Acts, in succession to W. S. Curphey (retired).

Dr. R. M. Caven has been appointed to the Chair of Inorganic and Analytical Chemistry in the Royal Technical College, Glasgow.

Dr. Joseph Kenyon has been appointed Head of the Chemistry Department at Battersea Polytechnic in succession to Mr. John Wilson.

Dr. F. Mollwo Perkin, Member of Council, has been appointed a Commander of the Most Excellent Order of the British Empire.

Obituary.

HENRY BASSETT (Senior), who was elected a Fellow of the Institute in 1878, died at Barnsbury on 30th August, aged 83 years. He received his training under Hofmann at the Royal College of Chemistry and after assisting Sir Benjamin Brodie for a short time at Oxford, became assistant to F. A. Manning, one of the Founders of the Institute, and one of the first chemists to establish a practice in the City of London. In 1894 he commenced practice on his own account, devoting special attention to non-ferrous alloys and the testing of anthracene, which he continued until a few months before his death. In 1864 he contributed to the Chemical Society a paper on ethyl orthocarbonate, which he prepared by the action of sodium on a mixture of chloropicrin and absolute alcohol; he also published a number of papers on the testing of anthracene and on other subjects in the Journal of the Chemical Society and the Chemical News. In spite of his advanced age, he was remarkably vigorous, physically and mentally, until a few days before his death. His son, Dr. Henry Bassett, also a Fellow, is Professor of Chemistry at University College, Reading.

FREDERICK WILLIAM FRANCIS DAY, who died in the Federated Malay States, in September, 1920, at the age of 37 years, was born at Pernambuco, Brazil, and educated at Sir William Turner's Grammar School, Coatham, Redcar, and King Edward's School, Bath, and the Royal College of Science, London. After working for two years in the Government Laboratory he obtained an official appointment in the Central Excise Laboratory at Kasauli, India, under Dr. (now Sir) Charles Bedford, and three years later proceeded to the Federated Malay States where, after three years in the Agricultural Department, he eventually joined, in October, 1918, the Malaya Research Branch of the Rubber Growers' Association. He was joint author with Mr. B. J. Eaton of several papers on the estimation of sulphur in vulcanised rubber, sulphur mixings, etc., published in the Journal of the Society of Chemical Industry, and on the potash-content of water-hyacinth and the oil-content and keeping quality of Para rubber seeds, published in the Agricultural Bulletin, F.M.S. He was elected an Associate of the Institute in 1919.

WILLIAM HODGSON ELLIS, who died recently at Lake Joseph, Muskoka, Canada, was born at Bakewell, in Derbyshire, in 1845. He graduated in Medicine in the University of Toronto, in which he became Professor of Applied Chemistry and Dean of the Faculty of Applied Science. For many years he was Public Analyst for Toronto and he was a recognised authority on Toxicology. He was elected a Fellow of the Institute in 1888.

ARTHUR HOWARD JAY died, after an operation, at Glasgow, on 13th September, 1920, in his 27th year. He was born at Bloxwich, Staffs., educated at Queen Mary's School, Walsall, and, in 1913, entered King's College, London. For about fifteen months he was engaged at the College in tar testing for the Ministry of Munitions, and in January, 1917, was appointed a Demonstrator in Chemistry, which position he held until July, 1919. About five weeks before his death he obtained an appointment on the Research Staff of Messrs. Nobel's Explosives Company. He was awarded the degree of B.Sc. in the University of London and was elected an Associate of the Institute in 1918.

EDWARD KINCH died at Haslemere on 6th August, aged 71 years. Educated at the Grammar School, Henley-on-Thames, and trained at the Royal College of Chemistry, he obtained his first appointment in 1869, as assistant to Prof. (later Sir) Arthur Church at the Royal Agricultural College, Cirencester. From 1873-75 he was on the staff of the Royal School of Mines; from 1875-76, superintendent of minerals in the Indian Museum, and from 1876-81 Professor of Chemistry in the Imperial College of Agriculture, Tokio, Japan. In 1881 he returned to the Royal Agricultural College as professor of chemistry, which position he held until the College was closed through depletion of staff and students, on account of the war, in 1915. He was the author of many papers on agricultural chemistry, contributed to the Journals of the Chemical Society and the Royal Agricultural Society, the Transactions of the Surveyor's Institution, &c., and revised *Church's Laboratory Guide*, ninth edition, in 1912. He was elected a Fellow of the Institute in 1878, and served as a Member of Council for three periods.

CHARLES CLIFTON MOORE died at Lymm, near Warrington, on 11th August, in his 58th year. He worked for over three years with Prof. Campbell Brown at the Royal Infirmary School of Medicine, Liverpool, when he became chemist at the Globe Works, St. Helens. He was subsequently for over five years at the Ammonia Soda Works of Messrs. Brunner, Mond & Co., and after practising in Liverpool as an analytical and consulting chemist, founded the firm of Messrs. Charles C. Moore & Co., Salt and Chemical Manufacturers at Lymm. He devoted considerable attention to the analysis of rocks, and contributed the results of a series of such investigations to the Liverpool Geological Society. He was elected a Fellow of the Institute in 1888. At his funeral the Institute was represented by Mr. Watson Gray, Chairman of the Liverpool Section.

GEORGE PILKINGTON, who died at Manchester on 1st April, 1919, in his fifty-eighth year, was born at Bury and educated at Malvern College and Owen's College, Manchester. He passed the Examination for the Associateship of the Institute in 1887, and was appointed Chemist to Messrs. J. R. Crompton & Bros., Ltd., Paper Manufacturers at Bury. From 1896 to 1902 he also held the appointment of Public Analyst for Bury. He was elected a Fellow of the Institute in 1890,

Books and their Contents.

“Catalysis.” E. Jobling. Pp. viii. & 144. (London : J. and A. Churchill.) 7s. 6d. net.

Sulphuric acid manufacture ; industrial chlorine ; salt cake manufacture ; sulphur recovery ; fixation of nitrogen ; surface combustion ; incandescent gas mantles ; hydrogen manufacture ; coal gas purification ; hydrogenation ; dehydrogenation ; synthesis of acetic acid ; hydrolysis, saponification, substitution, polymerisation, condensation ; enzymes ; electro-chemistry ; vulcanisation accelerators.

“Chemical Analysis of Steel Works Materials.” New Edition. F. Ibbotson. Pp. viii. & 296. (Longmans, Green & Co.) 21s. net.

General processes ; analysis of steel and pig iron ; steel-making alloys ; ores ; refractory materials ; slags ; fuels ; boiler water, scales, etc.

“Electro Deposition of Metals.” George G. Langbein. Pp. xii. & 862. (London : Hodder & Stoughton.) 42s. net.

History and theory ; preparation of objects ; deposition of nickel and cobalt, copper, brass and bronze, silver, gold, platinum and vanadium, tin, zinc, lead and iron, antimony, arsenic, aluminium ; deposition by contact, by boiling and by friction ; colouring and etching metals ; lacquering ; chemicals used.

“Indian Trade Inquiry : Report on Oil Seeds. Imperial Institute Memoirs.” Pp. viii. & 149. (London : John Murray.) 6s. net.

“Insect Pests and Fungus Diseases of Fruit and Hops.” P. J. Fryer. Pp. xv. & 728, with 24 plates. (Cambridge University Press.) 45s. net.

Insect pests and their control ; insecticides ; fungus diseases of fruit and their control ; fungicides.

- “Manufacture of Sugar from the Cane and Beet.” Monographs on Industrial Chemistry. T. H. P. Heriot. Pp. x. & 426. (Longmans, Green & Co.) 24s. net.

Raw materials; extraction of juice from the cane; extraction of sugar from beet; composition and treatment of cane and beet juices; evaporation of water from the juice; crystallisation; special methods of extracting sugar from molasses; by-products; refining of cane and beet sugars.

- “Margarine.” William Clayton. Pp. vii. & 187. (Longmans, Green & Co.) 14s. net.

Oils and fats used in margarine manufacture; edible hydrogenated oils; examination of milk for use in margarine manufacture; manufacture of margarine; theory of emulsification; butter and renovated butter; analysis; deterioration of butter and margarine in storage; lard compound; nutritional chemistry; bibliography.

- “Materia Medica.” H. G. Greenish. 3rd edition. Pp. xii. & 568. (London: J. & A. Churchill.) 27s. net.

Leaves; flowers; fruits; seeds; herbs and entire plants; woods; barks; subterranean organs; starches, glands, hairs, etc.; dried latex; dried juices; extracts; gums; resins; oleo-resins; tars; fixed oils, fats and waxes; saccharine substances; animals and animal glands and secretions.

- “Molinari’s Chemistry.” Vol. I.: Inorganic. T. H. Pope 2nd edition. Pp. xix. & 876. (London: J. & A. Churchill.) 42s. net.

Part I.: General. Part II.: Special. Part III.: Metals. Group I.: alkaline metals; Group II.: alkaline earth metals; Group III.: trivalent metals; Group IV.: tetravalent metals; Group V.: bismuth; Group VI.: chromium, molybdenum, tungsten and uranium; Group VII.: manganese; Group VIII.: iron, nickel, cobalt and the platinum group.

- “Paint Vehicles, Japans and Varnishes.” C. T. Holle. Pp. vii. & 203. (New York: John Wiley & Son, Inc.; London: Chapman & Hall, Ltd.) 13s. 6d. net.

Examination of petroleum thinners and of turpentine; alcohols and acetones; benzol and solvent naphthas; linseed oil; tung oil; miscellaneous paint and varnish oils; extraction of vehicle from pigment; estimation of water in paints; water emulsions and emulsifiers; determination of volatile thinners; examination of the

extracted oil ; effect of storage ; analysis of solid and liquid driers ; comparative analysis of black baking japans ; analysis of shellac lacquers and of varnishes and enamelling liquids.

“ Practical Chemistry.” P. A. E. Richards. 3rd edition.
(London : Bailliere, Tindall & Cox.) 5s. net.

Qualitative analysis ; preparations ; volumetric analysis ; elementary practical toxicology.

“ Principles of the Phase Theory.” D. A. Clibbens. Pp. xiv. & 383. (London : Macmillan & Co., Ltd.) 25s. net.

Phase theory and its application to the study of condensed binary systems ; condensed ternary systems ; condensed quaternary systems ; condensed quinary systems ; graphical methods ; phase reactions in equilibrium at the invariant point.

“ Recovering Precious Metals from Waste Liquid Residues.”
G. E. Gee. Pp. viii. & 380. (London : E. & F. N. Spon.)
16s. net.

Recovery of gold, silver and platinum.

“ Scientific and Applied Pharmacognosy.” H. Kraemer.
2nd edition. Pp. xi. & 741. (New York : John Wiley &
Son, Inc. ; London : Chapman & Hall, Ltd.) 33s. net.

Intended for the use of students of pharmacy as a handbook for pharmacists and as a reference book for food and drug analysts and pharmacologists.

Thallophytes ; archegoniates ; spermophytes ; animal drugs ; powdered drugs.

“ Treatise on Chemistry.” Roscoe and Schorlemmer. 5th
edition. Completely revised by J. C. Cain. Vol. I. :
Non-Metallic Elements. Pp. xvi. & 968. (London :
Macmillan & Co., Ltd.) 30s. net.

“ Yeasts, The.” A. Guilliermond ; translated by F. W.
Tanner. Pp. xix. & 424. (New York : John Wiley &
Son, Inc.) 33s. net.

Morphology and development of the yeasts ; cytology ; physiology ; nutrition, respiration and alcoholic fermentation ; origin ; methods of culture and isolation ; methods of characterisation and identification ; classification of the yeasts ; family of non-saccharomycetes ; pathogenic yeasts ; fungi related to the yeasts.

Changes in the Register.

At the meeting of the Council held on the 1st October, 1920, two new Fellows and 57 new Associates were elected, and 15 students were admitted.

The Institute has lost seven Fellows and two Associates by death.

New Fellows.

Clayton, Arthur, D.Sc., A.R.C.S. (Lond.), Oakwood, Kirkburton, near Huddersfield.
Walker, John Thom Ainslie, 14, Bride Lane, London, E.C.4.

New Associates.

Allen, Samuel, B.Sc. (Edin.), 321, Easter Road, Leith.
Ames, William Melville, M.A., B.Sc. (Edin.), c/o Inrie, 22, Melville Terrace, Edinburgh.
Austin, Charles Reuben, B.Sc.Tech. (Manc.), 548, Chester Road, Old Trafford, Manchester.
Barnett, Miss Amanda Mary Rossington, A.R.C.S.I., 30, Leeson Park Avenue, Dublin.
Burrell, Wilkinson William, M.Sc. (Manc.), Bank House, Colne Bridge, Huddersfield.
Collier, James Luke, A.R.C.S. (Lond.), 29, Ashchurch Park Villas, Ravenscourt Park, Hammersmith, London, W.
Davies, Cecil Whitfield, B.Sc. (Wales), Trewylan, Copers Cope Road, Beckenham, Kent.
Dawkins, Alfred Ernest, B.Sc. (Adelaide), Chemical Advisors Branch, Department of Defence, Melbourne, Australia.
Denton, John, Messrs. Denton Bros., Keighley Dyeworks, Keighley, Yorks.
Edwardes, John, B.Sc. (Wales), M.C., Tanffynon, Llangetho, Cardiganshire.
Evans, Kenrick, A.R.C.S. (Lond.), 9, Mathews Park Avenue, Stratford, London, E.15.
Evans, William Abraham, M.C., B.Sc. (Wales), 11, Heathfield Place, Cardiff.
Farmery, Joshua William, B.A. (Cantab.), Wellcome Research Laboratories, Khartoum.

- Fox, Maurice Henry, B.Sc. (Wales), Satis, Morden Road, Merton, London, S.W.19.
- Frost, Stanley Charles, 12, Charleville Circus, Sydenham, London, S.E.26.
- Garner, Major Frederick Basil, A.R.C.S. (Lond.), M.C., 26, St. Georges Road, Wimbledon, London, S.W.19.
- George, Ernest, B.A. (Cape of Good Hope), M.Sc. (S. Africa), c/o University College, Johannesburg, S. Africa.
- Glasspoole, John, B.Sc. (Lond.), 16, Pursers Cross Road, Fulham, London, S.W.6.
- Grant, Reginald Lindsay, B.Sc.Tech. (Manc.), M.C., Church Villa, Northenden, Cheshire.
- Harbord, Vernon, A.R.S.M., Englewick, Englefield Green, Surrey.
- Harley, Robert Bruce, B.Sc. (St. Andrew's), The University, Leeds.
- Highfield, Alfred, B.A. (Cantab.), Edina, Sidecup, Kent.
- Higson, Percy John, B.Sc. (Liv.), M.B.E., 11, Westbourne Road, Birkdale, Lancs.
- Holmes, Frederick Charles Victor, B.Sc.Tech. (Manc.), Alton Cottage, Holt, Percy Ashworth, B.Sc.Tech. (Manc.), Victoria Villas, Egerton, near Bolton, Lancs.
- Howarth, Gilbert Bartle, B.Sc. (Leeds), M.C., 2, Leopold Mount, Chapeltown Road, Leeds.
- Hyde, Claudius George, A.R.C.S. (Lond.), M.C., Hillcrest, Hillborough Road, Luton, Beds.
- Hyder, Mervyn George Garth, B.A. (Oxon.), 60, Newbury Street, Wantage, Berks.
- Jarrett, Wilfred Thomas, A.R.C.S. (Lond.), 124, East Street, Sittingbourne, Kent.
- Kirby Muxloe, near Leicester.
- Kirby, William, B.Sc. (Lond.), 17, Micheldeiver Road, Lee, London, S.E.12.
- Lowe, George Morris, A.R.C.S. (Lond.), 4, Kyverdale Road, London, N.16.
- Marchant, Ernest Norman, Fairhaven, Ansdell Road, Reddish, near Stockport.
- Marsh, Joseph Kenneth, M.Sc. (Belfast), 28, Lansdowne Road, Belfast.
- Martin, Frederick John, M.A. (Cantab.), Gordon College, Khartoum, Sudan.
- McLaren, Donald Alan, M.Sc. (Liv.), 106, Aigburth Road, Liverpool.
- Mills, James Dick Watson, B.Sc. (Edin.), 8, Comely Bank Street, Edinburgh.
- Mortlock, Frank, B.Sc. (Birm.), 54, Cope Street, Coventry.
- Nicholls, Frederick, B.Sc. (Dun.), D.S.M., 6, Trewitt Road, Whitley Bay, Northumberland.
- Nickelson, Stanley Arthur, B.Sc. (Lond.), Selworthy, Southwood Road, New Eltham, London, S.E.9.
- Nobbs, Sydney Wallace, B.A. (Cantab.), 6, Colls Road, Peckham, London, S.E.15.
- O'Brien, Arthur Matthew, Abadan, Persian Gulf.
- Peacock, Arthur Colin, B.A. (Oxon.), 43, Hawthorn Gardens, Monk-seaton, Northumberland.

- Pinkard, Frederick William, B.Sc. (Wales), 17, Somerton Road, Newport, Mon.
- Platt, Joseph Horace, B.Sc.Tech. (Manc.), 3, The Crescent, Prestwich, Manchester.
- Poole, Harold James, B.Sc. (Lond.), Avalleda, Balmoral Road, Parkstone, near Bournemouth, Dorset.
- Pyne, Gerald Thomas, A.R.C.S.I., 123, St. Lawrence Road, Clontarf, Dublin.
- Rhodes, James Eric Wynfield, B.Sc. (Lond.), Gorphwysfa, 1, Deyne Avenue, Prestwich, Manchester.
- Richardson, Miss Alice Muriel, A.R.C.S.I., 47, Kenilworth Square, Rathgar, Dublin.
- Sharp, Thomas Marvel, B.Sc.Tech. (Manc.), Harefield, 13, Moorland Road, Stockport.
- Spearing, Colin Everett, A.C.G.I., Winslade, Eversfield Road, Reigate Surrey.
- Stockley, Gordon Murray, A.R.C.S. (Lond.), Maratenne, 30, Windmill Road, Croydon, Surrey.
- Stott, Clarence, B.Sc (Leeds), Holywell Brook, Holywell Green, near Halifax, Yorks.
- Timmis, Laurence Barnett, B.Sc.Tech. (Manc.), 50, Claremont Road, Moss Side, Manchester.
- Trindle, John Henry, B.Sc. (Birm.), 142, Newcombe Road, Earlsdon, Coventry.
- Watts, Hugh Gower, A.R.C.S. (Lond.), 31, Queen's Road, Beckenham, Kent.
- Wheeler, Thomas Sherlock, A.R.C.S.I., 2, St. Lawrence Road, Clontarf, Dublin.
- Wright, Robert Norman, A.R.C.S. (Lond.), Front Street, South Hetton, Sunderland.

New Students.

- Blount, Reginald Willis, 21, Buller Street, Derby.
- Clark, Geoffrey Meeker, The Rectory, Farnley, Leeds.
- Colley, Albert Thomas William, 260, Dawlish Road, Bournbrook, Birmingham.
- Creasy, William George, 18, Kohat Road, Wimbledon, London, S.W.19.
- Edgerton, Herbert Ayre, 5, Rathcoole Parade, Hornsey, London, N.8.
- Hare, Andrew Thomas Stewart, Port Seton House, Cockenzie, East Lothian.
- Harrow, Andrew Nicoll, 86, Ava Street, Kirkcaldy, Fife.
- Kirkwood, Edmund, British Dyestuffs Corporation (Huddersfield), Dalton Works, Huddersfield.
- Shaw, George, 8, Albion Terrace, Hartlepool, Co. Durham.
- Thornewell, Miss Clarice Elizabeth, 163, Rood End Road, Oldbury, near Birmingham.
- Townend, Donald Thomas Alfred, 133, Mount Pleasant Lane, Upper Clapton, London, E.5.
- Turley, Harold George, 50, Harboard Street, Fulham Palace Road, London, S.W.6.

Wilkinson, Sidney Davis, 14, Warwick Road, Upper Clapton, London, E.5.

Woodhead, George Kenworthy, Heymoor Villas, Shepley, near Huddersfield.

Yapp, Miss Dorothy, Beech Hurst, Haywards Heath, Sussex.

DEATHS.

Fellows.

Henry Bassett.

William Hodgson Ellis, M.A. (Cantab.), M.B. (Toronto).

Edward Kinch.

George Lewin.

Charles Clifton Moore.

George Pilkington.

John Emilius Lancelot Shadwell.

Associates.

Frederick William Francis Day.

Arthur Howard Jay.

General Notices.

Examinations.—Examinations for the Associateship and Fellowship will be held at the Institute during the weeks commencing on the 10th and 17th January, 1921.

Candidates who desire to be examined in January should notify the Registrar before Monday, 29th November, 1920.

Notice to Associates.—Associates elected prior to November, 1917, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain particulars of the Regulations and forms of application for the Fellowship.

Appointments Register.—A Register of Fellows and Associates and Registered Students of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

Any Registered Student in the last term of his college course who desires to make preliminary arrangements with a view to obtaining an appointment may receive the Appointments Register of the Institute on the same terms as Fellows and Associates, provided that his application for this privilege be endorsed by his Professor.

A number of Registered Students of the Institute desirous of gaining practical experience will be glad to have opportunities of working in private laboratories or works during vacations.

The Library.—The Library is open for the use of Fellows, Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays: 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is also available for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 A.M. to 9 P.M. on week-days: (Saturdays from 10 A.M. to 5 P.M.)

Changes of Address.—In view of the expense involved through frequent alterations of addressograph plates, etc., Fellows, Associates, and Students notifying changes of address are requested, to give, as far as possible, their *permanent* addresses for registration.

Register of Chemical Assistants.—The Institute maintains a Register of Chemical Assistants who have passed approved Preliminary Examinations, and in some cases Intermediate Science Examinations. These youths are capable of doing useful laboratory work and are seeking positions at a living wage, while preparing by evening classes for their degrees and the Associateship of the Institute.

Fellows and Associates who from time to time have vacancies to offer such Chemical Assistants are asked, in the first instance, to communicate with the Registrar; they will thus assist in establishing on a definite footing a register of Chemical Assistants, who should in all cases be encouraged to become students of the Institute with a prospect of qualifying for the Associateship and Fellowship.

Lecture.—See p. 283.

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THE
INSTITUTE OF CHEMISTRY
OF
GREAT BRITAIN AND IRELAND.

FOUNDED, 1877.
INCORPORATED BY ROYAL CHARTER, 1885.

JOURNAL AND PROCEEDINGS.
1920.

PART VI.

Issued under the supervision of the Publications Committee.

RICHARD B. PILCHER,
Registrar and Secretary.

30, RUSSELL SQUARE, LONDON, W.C. 1.
December, 1920.

Publications Committee, 1920-21.

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Editorial.

WITH this Part the volume of the JOURNAL AND PROCEEDINGS for 1920 is completed. The Publications Committee has substantially fulfilled the programme which was arranged in the last Report of the Council. The Journal provides a concise record of the progress made by the Institute towards the consolidation of the profession and of the proceedings of the Council and Local Sections. It contains reports of Examinations, a record of the general business of the Institute, in addition to editorial articles and comments on matters of general interest to chemists.

In the present Part attention is directed to two cases recently before the High Court of Justice ; the first relating to the powers of Chartered Bodies, and the second relating to the question of contracts of employment. The judgment delivered in the first case is of importance to the Institute, especially in view of the desire of the Council and of the general body of Fellows and Associates to expand its sphere of usefulness, and it may here be remarked that the Legal and Parliamentary Committee have reviewed the present policy of the Institute in the light of that judgment, which will no doubt afford guidance to the Council when new propositions are before them. Arising from the judgment, however, they find no reason to advise any change in the present policy of the Institute.

The second case is likely to be of importance to chemists who are appointed under contracts providing for restraint of practice in particular branches of work for a period subsequent to the determination of their contracts, and to the employers of such chemists. The comments on this case, however, while they are believed to be entirely justified, should not be taken to apply to every case that may arise. Member, therefore, should note the warning that they should obtain professional legal advice in the event of the possibility of their becoming involved in any dispute with regard to such matters.

Extraordinary General Meetings.

Revision of By-Laws.—An Extraordinary General Meeting of the Institute was held at 30, Russell Square, London, W.C., on Thursday, the 28th day of October, 1920, at 3.30 p.m., Sir Herbert Jackson, President, in the Chair.

The meeting was called for the following purposes :—

“(1) To consider and, if thought fit, approve the sub-joined new By-Laws which will be submitted to the Meeting ; and in the event of the approval thereof, with or without modifications ; (2) to consider, and, if thought fit, to pass a Resolution to the following effect :—

“That the new By-Laws already approved by this meeting, and for the purpose of identification subscribed by the Chairman, be and the same are hereby approved, and that the same be and they are hereby adopted as the By-Laws of the Institute, to the exclusion of and in substitution for all the existing By-Laws.”

(The proposed new By-Laws were incorporated in the notice convening the Meeting.)

The notice convening the meeting having been read, the President explained that the alterations had been made after consultation with the Local Sections and Honorary Corresponding Secretaries. He acknowledged the careful work of the Sections and Corresponding Secretaries, of the General Purposes Committee, the Solicitors and Counsel, to all of whom the thanks of the Institute were due for their co-operation. The proposed new By-Laws were then considered *seriatim* and approved with the following modifications :—

On the motion of Mr. F. J. Lloyd, seconded by Dr. J. T. Dunn, in proposed *By-Law* 6, *Clause* (3), the words: “The non-
receipt of any such notice by any of the Members shall not

invalidate the proceedings in General Meeting ” were substituted for the words : “ The accidental omission to serve any such notice upon any of the Members shall not invalidate the proceedings of any General Meeting.”

On the motion of Mr. F. J. Lloyd, seconded by Mr. W. B. Ferguson, K.C., in proposed *By-Law* 14, *Clause* (1), the words : “ The instrument appointing a proxy shall be signed by the appointor ” were substituted for the words : “ The instrument appointing a proxy shall be in writing under the hand of the appointor.”

In proposed *By-Law* 28, *Clause* (2), the words : “ Appointing such proxy shall be signed by the appointor ” were substituted for the words : “ Appointing such proxy shall be in writing under the hand of the appointor.”

On a motion from the Chair, seconded by Mr. E. M. Hawkins, proposed *By-Law* 29, *Clause* (5) was amended to read as follows :—

“ If at any time after the balloting lists have been sent to Members, and before the dissolution of the Annual General Meeting, any candidate who would otherwise have been elected, has died or has withdrawn his nomination or has in any way become ineligible for office or Membership of the Council then :—

- (a) In the case of the election of an Officer the Members of the Council present may nominate and elect any eligible Fellow.
- (b) In the case of the election of a General Member of the Council the candidate having the next greatest number of votes shall be elected, or if there be no such candidate the Members present may nominate and elect any eligible Fellow.”

in the place of :—

“ If at any time after the balloting lists have been sent to Members, and before the dissolution of the Annual General Meeting, any candidate who would otherwise have been elected, has died or has withdrawn

his nomination, or has in any way become ineligible for Office or Membership of the Council, the candidate having the next greatest number of votes shall be elected, or if there be no such candidate, then :—

- (a) In the case of the election of an Officer the Members of the Council present may nominate and elect any eligible Fellow.
- (b) In the case of the election of a general Member of the Council the Members present may nominate and elect any eligible Fellow.”

It was agreed to delete from the proposed *By-Law* 41 the figure (1) which had been included unnecessarily.

A motion by Mr. W. B. Ferguson, seconded by Mr. C. E. Barrs, to reduce the number of members required to nominate for election as a general Member of the Council under the proposed *By-Law* 26, *Clause* (1) was put to the meeting and lost.

A letter received from Mr. J. H. Worrall, protesting against the fees proposed in *Chapter X*. was read, but, in view of the provisions of *By-Law* 61, under which the amount of the annual subscription is to be determined by a General Meeting, no action was taken.

The President having signed the proposed By-Laws as modified, the same were duly approved by the meeting, and it was resolved *nem. con.* :—

“ That the new By-Laws, as amended, already approved by this Meeting, and for the purpose of identification subscribed by the Chairman, be, and the same are hereby approved, and that the same be, and they are hereby adopted as the By-Laws of the Institute, to the exclusion of and in substitution for all the existing By-Laws.”

The meeting was dissolved.

A further Extraordinary General Meeting of the Institute was held at 30, Russell Square, London, W.C., on Friday, the 12th day of November, 1920, at 4 p.m., for the purpose of receiving a report of the proceedings at and the result of the Extraordinary General Meeting, held on 28th October, 1920, and for the purpose of considering the Resolution passed thereat, and, if thought fit, confirming the same.

Mr. George Stubbs, Vice-President, occupied the Chair, in the unavoidable absence of Sir Herbert Jackson, President.

The notice convening the meeting was read with the report of the Extraordinary General Meeting held on 28th October, and the Resolution passed thereat was thereupon confirmed by the following Resolution, which was moved from the Chair and unanimously adopted :—

“ That the new By-laws, as approved by the General Meeting on the 28th October, and for the purpose of identification subscribed by the Chairman, be, and the same are hereby approved, and that the same be, and they are hereby adopted as the By-laws of the Institute, to the exclusion of and in substitution for all the existing By-laws.”

The meeting was dissolved.

Proceedings of the Council.

(October—December, 1920).

War Memorial.—At a special meeting of the Council of the Institute held on 28th October, the President unveiled a Memorial to Fellows, Associates, and Students of the Institute who died in the service of their country in the Great War.

The President stated that over 700 Members and Students of the Institute were actually with the Forces during the War. Considering the unprecedented demand for their services in other Government work this was a very large number. That the losses by death were no greater than 55 was to be explained no doubt largely by the fact that many were re-called during the second and third years of the War for chemical service at home. The Council had been called to unveil the memorial to those who had died in the service of their country, a tribute which was the least that could be paid to them in remembrance of their courage, their loyalty and their patriotism. The President regretted that it was impossible, owing to the position of the memorial, for it to be unveiled in the presence of a General Meeting, but the Fellows and Associates would see it as they came to the Extraordinary General Meeting later in the day. The Council proceeded to the vestibule, when the President said :

“ On behalf of the whole Institute we will now unveil this memorial to honour our Fellows, Associates, and Students who gave their lives for their country and to perpetuate their memory. We do it in a spirit of grieving for their loss, of deep gratitude for the sacrifice which they made, of pride in all that they were and did, and of sympathy with those to whom their deaths have brought such great sorrow.”

FELLOWS, ASSOCIATES AND STUDENTS OF THE
INSTITUTE OF CHEMISTRY WHO DIED IN THE
SERVICE OF THEIR COUNTRY 1914-1918.

JAMES AMOS BENEY.

JOHN L. S. ALLEN.

JAMES TOWNSEND ARCHERD.

JAMES SCOTT BARNARD.

ANTHONY SAMUEL BAKER.

JOSEPH BELL BARNARD.

JOHN EDWARD BISHOP.

DAVID BOND.

HAROLD WILLIAM BROOKS.

JOSEPH ARTHUR BROWN.

CLARENCE E. BUTCHER.

JOHN T. P. CAMPBELL.

JOHN M. CAMMUTHER.

STEPHEN H. CANNETT.

RALPH JOHN COHEN.

WILLIAM VIVIAN CROFT.

WENDELL GORDON CROFT.

ALEXANDER GEMMELL.

STUART J. GILFILLAN.

GEORGE H. GILFILLAN.

JOSEPH ALLEN HARRIS.

EDWARD PAUL H. HARRIS.

CHARLES GEORGE HARRIS.

JOHN ROBERT HARRIS.

ROBERT HARRIS.

JOHN HARRIS.

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The memorial which was draped with the Union Jack was then unveiled and the "Last Post" was sounded by Mr. William Smith, formerly of the Band of H.M. Scots Guards, Housekeeper to the Institute.

The memorial consists of four bronze plaques mounted on a framework of oak, the superscription and names being cast in solid block letters :—

**FELLOWS, ASSOCIATES & STUDENTS OF THE
INSTITUTE OF CHEMISTRY WHO DIED IN THE
SERVICE OF THEIR COUNTRY, 1914-1918.**

JAMES WATSON AGNEW
JOHN L. S. ALLAN
JAMES DUNCAN ARCHIBALD
JAMES SCOTT BAINBRIDGE
MONTAGUE SAMUEL BAKER
JESSE DELL BERRIDGE
JOHN EDMUND BISHOP
GAVIN BOYD
WHAROLD ILLIAM BROOKE
JOSEPH ARTHUR BROWN
CLARENCE E. BUTCHER
NORMAN P. CAMPBELL
GEORGE M. CARRUTHERS
STEPHEN H. DENNETT
RALPH JOHN DUNN
WILLIAM VIVAISH EASTMAN
KENNETH GORDON GARNETT
ALEXANDER GEMMELL
STUART WYCLIFFE GOODWIN
REGINALD GREAVES
JOSEPH WALTER HARRIS
EDWARD FRANK HARRISON
CHARLES OSWALD HAYWARD
JOHN ROBERTSHAW HILL
RICHARD HOFMEYER
GLYN JONES
SIMON JAMES JONES
ROBERT GORDON KIND

HERBERT KING
GEORGE WILLIAM MOORE
CYRIL JOHN NIXON
THOMAS M. PATERSON
ARNOTT ANDREW PATTERSON
JOHN HOWARD POTTER
JULIUS SEFTON PRINCE
ALBERT A. ROBINSON
LAWTON KEIR RODGER
KENNETH ROSS
FERRIBEE SADLER
FRANCIS W. SANDERSON
W. GILBERT SAUNDERS
GEORGE EVANSTON SMITH
JAMES SALSBUURY SMITH
LESLIE PHILLIPS SMITH
GUY SOMERVILLE STEWART
OLIVER JOHN STONE
JOHN HOLDER STEARN
ALLAN ROBERT STEELE
EDWARD L. J. STOCKDALE
WILLIAM CURRIE TAYLOR
ARTHUR GUTHRIE TYE
HAROLD VERNON
JOSHUA B. C. WIGFIELD
CYRIL GEORGE WILLIAMSON
THOMAS WRIGHT

British Chemical Glassware.—At the Meeting of the Council held on 26th November a request was received from the British Chemical Ware Manufacturers' Association and from the President of the Society of Glass Technology, that representatives of the Institute should be appointed to join a deputation, to the Board of Trade, of manufacturers, traders and users of chemical glassware in support of the Key Industries Bill so far as it affected the production of British chemical glassware. The Council while diffident about taking part in any matter which might appear to indicate political interest, felt that in view of the work of the Glass Research Committee in encouraging the industry and the response of the manufacturers who established it during the war, the request should not be declined without careful consideration, and after a prolonged discussion, decided to telephone to Mr. Lester Swain, the representative of the Association, and to invite him to attend the meeting. Mr. Swain having been heard, the Council resumed the consideration of the matter. The Council, having due regard to the necessity for maintaining supplies satisfactory both as to quality and quantity for scientific and educational work, were of opinion that it was desirable to promote the manufacture of chemical glassware in this country, and to give the manufacturers a fair chance within a reasonable time limit to establish the industry. They therefore agreed to appoint representatives—the President and Treasurer, with Mr. A. Chaston Chapman, Mr. F. H. Carr, and Mr. William Macnab—to attend the Deputation on the understanding that such representatives should be free to express independent views on the matter.

The Deputation, consisting of manufacturers, dealers, workers, and users of optical and scientific glassware, was received by a Permanent Secretary, on behalf of Sir Robert Horne, the President of the Board of Trade, on 1st December.

Mr. C. Jessom, M.P. for Walthamstow, introduced the Deputation.

Mr. S. N. Jenkinson, President of the Society of Glass Technology, and Mr. Frank Wood, representing the British

Chemical Ware Manufacturers' Association, pressed for immediate legislation, agreeing that where the quality or quantity of British production fell short of requirements a Committee, consisting of manufacturers, dealers and users, should be appointed to grant import licences. They urged that a Bill should be introduced without delay if they were to avoid closing down the factories for this work.

Mr. Cosser spoke on behalf of manufacturers of lamp-blown glassware.

Mr. Jack and Mr. Henderson spoke on behalf of the National Glassmaker's Society, urging that the interests of 15,000 workmen were involved, and that if the chemical glassware industry were established, work would be found for disabled service men.

Mr. Tatlock, of Messrs. Baird & Tatlock (Glasgow), on behalf of the British Laboratory Ware Association, spoke in support of the representations made by the previous speakers.

Mr. Chaston Chapman, in regretting the absence, through illness, of Sir Herbert Jackson, and of the Treasurer, reminded the Board of the work of the Glass Research Committee of the Institute in the early days of the war. The representatives of the Institute were not present to give expression to any views of a political character nor to deal with the administrative side of the question. The Institute was one of the most important bodies of users of laboratory glassware, and was hopeful that the industry would be firmly established in the country. The position which arose at the outbreak of war was such that they were anxious not to be liable to the same experience. For the extension of knowledge, for the everyday work of chemists, and for the use of chemists engaged in the production of war material, good laboratory glassware was absolutely essential. The Council of the Institute hoped that the manufacturers who had undertaken the production of such ware would be given reasonable time to put themselves in a position to face foreign competition. They were not unmindful of the debt they owed to those manufacturers who had helped them

when supplies had been cut off from abroad and stocks practically exhausted. Perhaps all that they needed had not been forthcoming, but they had been helped substantially, and were able to carry on their work. They could not now say "Goodbye" to these manufacturers and leave them to shift for themselves, without any effort to help them at the present juncture. On the other hand, laboratory glassware was so necessary that if the British manufacturers could not supply it, the users must perforce obtain it elsewhere. The representatives of the Institute were not there to suggest the machinery for regulating these matters, but they hoped that every encouragement would be given to the industry, in the interest of the country and to prevent the recurrence of the situation in which it was placed in the autumn of 1914. The views of Mr. Chaston Chapman were supported by Mr. Macnab and Mr. Carr, the latter referring to the views on the subject held by chemists in various parts of the country.

The Permanent Secretary of the Board held out no hope of the Bill being introduced before Christmas, but foretold the great probability of it being the first measure to be brought forward in the next session.

Mr. Jessom indicated his intention to put a question in the House of Commons to the President of the Board before the recess.

(In view of the possibility of the Institute being asked to intervene in any similar matter, the Council deemed it desirable that they should hold a special meeting to decide upon a policy which would enable them to give an independent opinion upon measures before Parliament on which they are entitled to be heard in the interests of the profession.)

Income Tax.—The Commissioners of Inland Revenue received on the 10th December a deputation from the National Union of Scientific Workers, the Institute of Chemistry, the British Association of Chemists, and other bodies, with regard to the claims of chemists and others for abatement of income tax in respect of subscriptions to societies, subscriptions to

libraries and to periodicals, purchase of books and instruments, damage to clothing, travelling expenses to meetings and conferences, rent and expenses of private laboratories and studies, and other expenses incurred in research.

The deputation was introduced by Prof. Leonard Bairstow, who reviewed the general position, in relation to Income Tax, of those engaged in scientific work. The representatives of the Institute were Dr. O. L. Brady, Mr. Cecil H. Cribb, and the Registrar. The deputation sought to demonstrate that scientific workers, whether in independent practice or engaged in whole-time or part-time appointments, incurred the expenses referred to essentially in the exercise of their professions. The Commissioners intimated that, in the case of those who derive their incomes from appointments, claims in respect of such expenses would need to be decided according to the terms of their respective appointments.

Such claims could not ordinarily be allowed except in cases where it could be proved to the satisfaction of the Commissioners that the expenses were incurred necessarily, wholly, and exclusively, in the performance of duties required to be carried out under formal agreement.

At the conclusion of the conference, the deputation agreed to formulate a schedule of definite proposals for the consideration of the Commissioners.

Institutions.—The Leeds Central Technical School has been added to the list of Institutions formally recognised by the Council for the training of day-students as candidates for the examinations of the Institute, subject to certain conditions which have been accepted by the authorities of the College.

District Members of Council.—The General Purposes Committee have had under preliminary consideration the rules to be prepared by the Council to provide for the election of District Members of Council. They have determined the general principles and hope to be able to submit a definite scheme at the next Meeting of Council.

Register of Laboratory Assistants.—The editorial article in Part V. dealt with the provision of a register of chemical assistants. The register is now formally instituted ; but the Council have decided, after careful consideration of the powers conferred by the Charter of the Institute, that it shall be available only to assistants whose parents or guardians give a definite undertaking that such assistants will fulfil the conditions prescribed, including registration as Students of the Institute, with a view to qualifying in due course as Associates. Further, to conform with the nomenclature adopted in certain Government Departments, the Council have decided that the expression "Laboratory Assistants" should be adopted instead of "Chemical Assistants."

Public Analysts and Local Government Officers.—The Council have received information regarding the formation of the National Whitley Council for Clerical, Administrative and Technical Services of Local Government Authorities, of which the Secretary is Mr. R. V. O. Graves, 31 Chapel Street, Westminster, S.W.1.

The National Council includes representatives of local authorities and representatives of the National Association of Local Government Officers, which is the "trades union" for such officers. This Association claims that it would be able to act for Public Analysts as a whole, provided the body of Public Analysts became affiliated to them, and it would act for any individual Public Analyst provided he were a member of any branch of the Association. Branches exist in many important localities. One whole-time Public Analyst is known to have joined a branch of the N.A.L.G.O., and through their representation has received additions to his remuneration on the Civil Service bonus rate.

The Council hold that it would not be within the function of the Institute to form a trades union of Public Analysts and other chemical officers of local authorities, although such a body might be formed outside the Institute to deal with matters of this kind.

Colleges Undertaking Professional Chemical Practice.—The Public Appointments Committee is giving further consideration to the question of Colleges, particularly agricultural colleges, undertaking professional practice.

Several of these institutions, which are subsidised by the State and by public funds provided by local authorities, required their teachers of agricultural chemistry to conduct analyses for agriculturalists in their respective districts, at purely nominal fees. This system not only affords a privilege to one section of the community at the expense of the public in general, but imposes on the teachers duties which are liable to interfere with their educational work, and, at the same time, involves in many cases undue interference with independent practice.

Unemployment Insurance Act, 1920.—A Fellow of the Institute having been called upon to have his professional staff compulsorily insured against unemployment under the above Act, enquiries were made by the Institute, and it was found that analytical chemists earning more than £250 per annum are not considered to be within the Act, and that there was no need for principals to apply for their exemption.

India.—Ordnance Department.—The Council note with satisfaction the appointment of Dr. Norman L. Sheldon as Chief Inspector of Explosives, Government of India. This highly responsible appointment, which has previously been held by military officers, is one of several of a similar character which the Council of the Institute have repeatedly urged should be entrusted only to properly qualified and experienced chemists.

British Engineering Standards.—Representatives of the Institute attended a meeting of the Chemical Engineering Sectional Committee of the British Engineering Standards Association on 23rd November, when Sub-Committees were appointed to prepare standard specifications for certain forms of chemical plant.

Conjoint Board of Scientific Societies.—Sir Herbert Jackson, President, and Sir James Dobbie, Past-President, have been re-elected as representatives of the Institute for 1921 on the Conjoint Board of Scientific Societies.

Benevolent Fund.—The sum of nearly £300 has been subscribed to the Benevolent Fund. The Finance Committee, with the concurrence of the Council, have given directions that, notwithstanding the opinion of the solicitors and counsel of the Institute that the Fund may be regarded as within the chief aims of the Institute, all expenses incurred in promoting and maintaining the Fund, including all printing matter in the Journal, notices, postage, stationery, &c., shall be debited to the Fund in order that the General Account of the Institute shall be subject to no charge on this account.

Lectures.—In accordance with the notice issued with Part V., Mr. Joseph Turney Wood delivered, at University College, London, on 24th November, a lecture on "Some Scientific Aspects of Tanning."

On the motion of Prof. F. G. Donnan, who presided in the unavoidable absence of Sir Herbert Jackson, a hearty vote of thanks was accorded to the Lecturer, and on the motion of Mr. E. Grant Hooper the thanks of the Institute were accorded to Prof. Donnan for acting as chairman and to the authorities of University College for the use of the Chemical Lecture Theatre. The Lecture will be published in due course.

With reference to the suggestions made by the Lectures Committee, referred to in Part V. (p. 283) on the subject of popularising science, the attention of the Institute has been directed to an instance in which a Fellow has given some lectures on Steel to a Branch of the Foremen's Mutual Benefit Society and the Engineering Students of a local Technical School. The Lectures Committee feel that chemists who endeavour in this way to make known to workmen and others the underlying scientific principles of technical work are not only affording useful information to the uninitiated, but rendering good service to the profession.

Finsbury Technical College.—Many Fellows and Associates, including old Students of Finsbury Technical College, are taking part in a movement the object of which is to enable the City and Guilds of London Institute to keep the College in being instead of closing it next year. The Councils of the professional Engineering Bodies and the Council of the Institute are giving their support to the movement to maintain this important Technical Institution. The use of the Council Room of the Institute was allowed for a conference on the matter, held on 15th December. Ex-Students of the College are invited to communicate with Mr. J. H. Coste, F.I.C., "Utopia," Gloucester Road, Teddington.

Regulations: Class Examinations.—The Council have been in communication with the Senate of the University of London with regard to candidates who have taken courses in physics and mathematics but have not passed class examinations as required by the Charter and Regulations of the Institute. To meet such cases and to bring them within the terms of the Charter the Senate of the University have passed the following resolutions:—

That candidates wishing to qualify for the Associateship of the Institute of Chemistry of Great Britain and Ireland be admitted to examination in Physics and Mathematics at the General Intermediate Examination in Science for External Students, that the results of such examinations be communicated to the Institute of Chemistry directly, that the names of the Candidates do not appear on the Pass List, and that no certification be issued to them.

That candidates taking Physics and Mathematics at the Intermediate Science Examination for the purpose of qualifying for the Associateship of the Institute of Chemistry be charged a fee of £2 2s. for each subject.

The Council are gratified to acknowledge the consideration shown by the University in this matter.

The Admission of Associates to the Fellowship.—

Some misunderstanding still seems to exist with regard to the Regulations for the admission of Associates to the Fellowship. Under the present regulations all candidates elected to the Associateship subsequently to July, 1917, whether or not they have passed an examination held by the Institute, will be required to comply with the same conditions before election to the Fellowship. These conditions, in brief, require either the passing of an examination both written and practical in some special branch of chemistry, or satisfying the Council that they have by research, inventions or otherwise materially contributed to the advancement of chemical knowledge.

Candidates who pass the examination for the Associateship in future are not in a more favourable position with regard to election to the Fellowship than those who are admitted without examination under the new regulations.

It must be pointed out, however, that there are still a few Associates who passed the examination previous to July, 1917. These are entitled to apply for the Fellowship under the regulations in force at the time of their admissions. In addition there are still a few students who, having been registered before July, 1917, are entitled to apply for admission to an examination for the Associateship in a special branch of chemistry and to proceed to the Fellowship under the regulations in force at the time of their registration as students.

These regulations, however, state that an Associate applying for the Fellowship must satisfy the Council that he has been engaged in the study and practise of pure and applied chemistry in a manner satisfactory to the Council for at least three years since his admission as an Associate. There is no limitation in the interpretation of the phrase "the study and practical work of applied chemistry in a manner satisfactory to the Council"; so that if the Council is not satisfied, they have power under the Charter to impose an examination. Any student registered before July, 1917, who chooses to take the examination for the Associateship in General Chemistry or to be elected to the Associateship without

examination, by putting himself under the new regulations, forfeits any privileges attaching to the regulations in force at the time of his admission as a student.

Examiners' Assistant.—Mr. Leonard E. Hinkel, on his appointment as Lecturer in Chemistry at University College, Swansea, has resigned from the position of Assistant to the Board of Examiners of the Institute which he had held for the past thirteen years. The Council have expressed their high appreciation of and their cordial thanks for his services. The duties of the Examiners' Assistant will be undertaken by Mr. G. S. W. Marlow, Assistant Secretary.

Use of Poison-Gas in Warfare.—In the House of Commons on 15th November, replying to Lieutenant-Commander Young and Mr. Hogge, Mr. Lloyd George said that the whole subject of the use of poison-gas in warfare had been under careful consideration by the Cabinet, and it had decided on March 4th that the question should be raised at the Council of the League of Nations. It was obvious that this was a question on which our action must depend on that of other nations. It was realised, therefore, that, as other countries had continued to develop this method of warfare, the safety of our fighting Services would be seriously jeopardised by lack of similar development in this country, and it was decided on May 12th that, pending a pronouncement on the subject by the League, the fighting Services should continue their researches and experiments. The War Office Committee had been constituted as part of the organisation necessary for the continuation of these studies. The whole subject would, of course, have to be reconsidered when the Council of the League of Nations had made its pronouncement.

In reply to supplementary questions, Mr. Lloyd George said that he thought the question had been considered already by the Council of the League, but that no decision had been

arrived at. He was not quite sure whether it was on the agenda for Geneva. There were powerful countries which were not in the League at all, and that should be borne in mind. In one of those countries experiments were going on at the present moment. He could give no further information as to action being postponed until a resolution was arrived at. He did not think that a country like this, with the painful experience of the last four or five years, could take unnecessary risks. The nations must march together in a matter of that kind.

Remuneration of Chemists.—The Publications Committee regret that the report on the returns received in reply to the circulars issued in August and October could not be completed in time for publication in this Part of the Journal. The report will appear in Part I., 1921.

Legal Notes.

Chartered Institutions.—In a friendly case of importance to Institutions incorporated by Royal Charter—*A. J. Jenkin v. The Pharmaceutical Society of Great Britain*—before Mr. Justice Peterson in October, judgment was given upon a number of questions bearing on the inclination of professional bodies to extend their functions on behalf of their members or any part of them.

The plaintiff claimed a declaration that it was not within the objects, powers, or purposes of the defendant society to undertake or perform any of the matters or things mentioned in paragraphs 6 and 7 of the statement of claim, and that all such acts therein referred to were *ultra vires* the society; and he further claimed an injunction to restrain the society from spending any part of its funds for any of the said purposes.

Paragraphs 6 and 7 of the statement of claim said that the defendants' society alleged that under its Royal Charter and

under the Pharmacy Acts it had the necessary power to take part in the promotion and establishment of an Industrial Council for the drug trade or industry, and, further, to undertake and perform the following matters and things :—

- (a) To regulate the hours of business of members of the society.
- (b) To regulate the wages and conditions of employment as between masters and employees who were members of the society.
- (c) To regulate the prices at which members should sell their goods.
- (d) To exercise the function of an employers' association.
- (e) To insure and effect insurances of members of the society against errors, neglect and misconduct of employees, and against fire, burglary, damage to plate glass, and generally against insurable risks.
- (f) To audit accounts, collect debts and take stock for its members.
- (g) To provide and maintain an employment register and a register of unsatisfactory employees.
- (h) To provide and supply information as to the commercial standing of persons and firms with whom members of the society wish to transact business.
- (i) To provide legal advice to members.

Counsel for the plaintiff contended that the powers which were sought were in certain cases in restraint of trade, and therefore would, at the time when the Charter was granted, have been illegal, so that they cannot have been contemplated at that time. He thought that some of the objects of the Society were not of themselves objectionable, but, taken as a whole, the powers were not contemplated when the Charter was granted. He further contended that the powers of the Society could not be used for the protection of one class of members, the employers, against the other, the employee class.

Counsel for the Society held that all the proposed arrangements were for the benefit of all the members of the Society ; and, secondly, that a chartered body, whilst enjoined to perform specified functions, could do any act which an ordinary person could do, and could therefore not be restrained by the Court from performing any acts which were legal, on the ground that such performance might cause the Privy Council at a future date and under certain circumstances to take away the Charter.

Mr. Justice Peterson, in delivering judgment, agreed that a corporation, created by Charter at common law, could do with its property all such acts as an ordinary person could do, and could bind itself to such contracts as an ordinary person could bind himself to; and even if the charter expressly prohibited a particular act, the corporation could, at common law, do the act, but it did not follow that a member of a chartered society could not take legal proceedings to prevent the society or its governing body from doing acts outside the purposes authorised by its charter, which might lead to the destruction of the corporation by the forfeiture of its charter.

In his opinion he was justified in holding that if the Society intended to do acts which were not authorised by its charter, a member was entitled to ask for an injunction restraining the commission of acts which were outside the scope of the charter, and which might result in the forfeiture of the charter, and the destruction of the society.

He further added that the Pharmacy Act of 1852 had imposed a Statutory limitation upon the objects of the Society in consequence of which it was necessary to scrutinise the proposals with the object of ascertaining whether they came within the purposes of the society, as so limited.

Dealing with the acts or proposals of the Society, he said that no serious objection was taken to the matters referred to in (f), (h), and (i) of paragraph 7 of the statement of claim. As to (g) it was not contended that the provision of an employment register was outside the powers of the society; but it was said that the maintenance of a register of unsatisfactory employees was in the interests of the employers, and was or might be contrary to the interests of such of the members as were employees, and that it was, therefore, not a provision for the benefit of the members as a whole. In his opinion there was no valid objection to the matter referred to in (g).

The proposals contained in (e) were, in his view, on a very different footing. They would enable the society to carry on an insurance business of any kind, and the carrying on of an

insurance business did not come within any of the purposes of the charter, and was not contemplated by any person as a possible object of the society at the time when the charter was granted. The proposals in (a), (b), and (c) were also open to objection. In carrying out these proposals the society would convert itself into a trade union within the definition of section 16 of the Trade Union Act, 1876. In his opinion the aims referred to in those clauses were not within the purposes authorised by the Charter. He felt some difficulty in dealing with the proposal referred to in (d), as there was no evidence to show what were the acts intended to be included in the words "the functions of an employers' association." He was therefore not in a position to express an opinion on the proposals. With regard to the Industrial Council, some of its objects were the same as the proposals contained in (a), (b), and (c). The society, therefore, was not authorised to expend part of its funds in the promotion or establishment of the work of the committee. There would, therefore, be a declaration that it was not within the powers or purposes of the society to take part, or expend any of its funds in the promotion, establishment, or work of the Industrial Council or to undertake or perform any of the matters or things mentioned in paragraphs (a), (b), (c) and (e), and there would be an injunction.

For the information of members, it may be mentioned that the Charter of the Pharmaceutical Society was granted for the purpose of "advancing Chemistry and Pharmacy, and promoting an uniform, system of education of those who should practise the same ; and also for the protection of those who carry on the business of Chemists and Druggists " ; and also for the provision of a Benevolent Fund. The objects of the Institute of Chemistry as laid down in its Charter are quite different, but the judgment is of interest because of its general bearing upon the activities of Chartered Bodies. It would doubtless be a matter for objection if the funds of such a body were devoted to supporting one class of members, say those who were employers, against another class, employees.

Chartered Bodies exist for the benefit of the public and for the benefit of their members as a whole. Actions which could not be justified on these grounds and which might jeopardise the charter are, therefore, clearly open to objection. Members subscribe to chartered professional bodies on the understanding that the funds supplied will be utilised for the purposes for which their societies were incorporated, and it was admitted by Counsel for the Pharmaceutical Society that the Court could restrain the use of money paid on certain terms for other purposes than those for which it was paid.

The view of the Council of the Institute, that the Institute, consisting as it does of employers and employees, could not adopt the functions of a trade union, appears to have ample support in the arguments and judgment of this case, apart from the question of the desirability or otherwise of promoting such organisation.

Contracts in Restraint of Trade.—An important case relating to employment contracts was recently before Mr. Justice Astbury in the Chancery Division.

The defendant, a film actor, entered into a contract with the plaintiff company to act in films for the company under a pseudonym. He covenanted that on the expiration of his agreement he would not use such pseudonym in connection with his profession without the express permission of the plaintiff company.

In the course of his engagement he acquired considerable reputation as an actor, and after the expiration of his contract he entered into an engagement with a competing firm, and, despite his former contract, played under his pseudonym. The plaintiffs asked for an injunction to restrain him from so doing, but judgment was given for the defendant with costs. This judgment was later upheld by the Court of Appeal.

Mr. Justice Astbury, in reviewing the arguments, gave a summary of a number of earlier judicial decisions. He referred in the first place to the fact that if the plaintiffs succeeded in their action, their success would either enable them to retain the services of the defendant at a salary far

below that which he could command as a free man, or would compel him to accept less than his market value elsewhere until such time as he re-established his identity, or made, as it were, a reputation equal to that which he then enjoyed for an apparently new individuality.

He then said :

“ Now, the decisions of the House of Lords in Mason’s case and Saxelby’s case establish, if I read them aright, the following propositions : (a) Notwithstanding the sanctity of contracts between parties of full contracting power bargaining with their eyes open, a restraint inconsistent with the elementary freedom of an employee to earn his living as best he can, is, subject to certain exceptions, invalid. (b) With regard to the apparent antagonism between the right to bargain and the right to work, the extreme of the one destroys the other, and the law answers the public interest by refusing to enforce agreements when the right to bargain has been used so as to afford more than a reasonable protection to the covenantee. (c) This protection must fall far short of tyranny. (d) Where an employer has exacted a covenant in unreasonably wide terms, the Courts do not attempt to carve out of this void covenant the maximum that the employer might legally have exacted. (e) The exceptions to the rule that an employee shall not be prevented from earning his living as best he can include the right of an employer to protect his trade secrets and prevent his old customers from being wrongfully enticed away from him, but protection from competition is not among those exceptions, and there is apparently no case in which a covenant against competition by an employee has, as such, ever been upheld by the Courts. (f) Just as a vendor may subject himself to restraint in order to obtain the best terms on the sale by him of a business, so an employee may do so to obtain employment or training under a desirable employer, but in each case the restraint must be no more than is reasonable to afford adequate protection to the covenantee, and in the employer and employee case, competition, as such, is outside the area of protection that the law considers permissible, as is also protection against the use of the personal skill and knowledge acquired by the employee in his employer’s service. (g) In restraint upon employees, nothing is sold or handed

over by a present to a future possessor. The contract is an embargo upon the energy, activities and labour of a citizen, and the public interest coincides with his own in preventing him on the one hand from being deprived of the opportunity of earning his living, and in preventing the public, on the other, from being deprived of his work and service. And lastly, (*h*) a man's aptitudes, his skill, his dexterity and his manual or mental ability may not nor ought to be relinquished by an employee. They are not his master's property, they are his own, they are himself. These propositions are taken literally, or substantially from the opinions expressed by the learned Lords in the two authorities I have referred to, and I have not, in selecting or arranging them as I have done, consciously divorced them from any context by which they can or ought to be modified."

In the Court of Appeal two judgments of the House of Lords were quoted which further elucidate this question. In the first of these, Lord Shaw, dealing with the case of a servant seeking fresh employment and using information which he had obtained in the course of his employment of his previous master, said: "Upon this last point, my Lords, there was much argument at your Lordships' Bar as to whether this case did not fall within the principle of *Haynes v. Doman*. But *Haynes v. Doman* was a case, and was expressly so treated, of the divulging of trade secrets, and of a servant entering into new employment carrying with him these trade secrets, with the constant risk of divulging them to rival manufacturers. Such cases, my Lords, are, in my opinion, widely distinguished from the other cases of an employee who, by faithful and industrious exercise of his powers, becomes mentally, or even manually, well equipped as a servant. The distinction between that case and the former is as wide as the psychological distinction between subjective and objective knowledge. But it is also as real. For, in the former case, the equipment of the workman becomes part of himself, and its use for his own maintenance and advancement could not, except in rare and peculiar instances, be forbidden. But in the other case the knowledge of trade secrets may be as real and objective as

the possession of material goods, and the law would much more readily support a restraint of liberty which would, or might, be likely to induce the transfer of this to others, with the danger of consequent loss. In all cases of restraint sought to be put upon an employee under a contract between master and servant this distinction should be borne in mind." In the second case Lord Parker said: "As I read Lord Macnaughten's judgment, he was of opinion that all restraints on trade of themselves, if there is nothing more, are contrary to public policy, and therefore void. It is not that such restraints must of themselves necessarily operate to the public injury, but that it is against the policy of the common law to enforce them except in cases where there are special circumstances to justify them. The onus of proving such special circumstances must, of course, rest on the party alleging them," and Lord Justice Atkins, in amplification of this quotation, said: "It is a misapprehension to suggest that this doctrine is confined merely to restraint of trade in any ordinary meaning of the word 'trade'; it extends further than trade, it undoubtedly extends to the exercise of a man's profession or calling."

Chemists interested in the question of service agreements may well reflect upon these authoritative statements, as they may help to dispel the doubts and perplexities which are sometimes felt in considering this difficult subject. The facts of each individual case should, however, be carefully weighed, and it is advisable to remember that the correct application of legal principles to a particular case is not a task to be lightly undertaken by a layman.

Local Sections.

Gretna and District Section.—The number of members of the Section has considerably decreased during the year, but the Council have requested the Officers and Committee to continue the work of the Section pending the decision of the Government with regard to the future of H.M. Factory.

Irish Section.—The Annual General Meeting was held on 19th November, when the Officers and Committee were elected as follows :—Chairman, Dr. W. E. Adeney ; Treasurer, Prof. Sydney Young ; Secretary, Dr. A. G. G. Leonard ; Committee, Mr. R. F. Blake, Sir Charles A. Cameron, Mr. B. G. Fagan, Dr. J. H. Millar, and Prof. Hugh Ryan.

The Section suggested that a form for subscription to the Benevolent Fund should be circulated to Fellows and Associates with the notices regarding annual subscriptions.

Liverpool Section.—The second annual dinner of the Section was held at the Midland Adelphi Hotel on 3rd December, Mr. W. H. Roberts in the chair. The guests included Mr. Alderman Muirhead, Chairman of the Health Committee, Liverpool Corporation, Mr. James Barr, Honorary Secretary, Manchester Section of the Institute, the Registrar and Mrs. Pilcher, and Mr. G. S. W. Marlow, Assistant Secretary.

The loyal toasts having been duly honoured, the Chairman read a telegram from Sir Herbert Jackson, President, regretting that he and Lady Jackson were unable to be present, and conveying their best wishes, to which a reply was sent expressing the hope that Sir Herbert would soon be restored to good health.

Mr. P. G. Jackson proposed "Liverpool : Its Industries and Commerce," to which Mr. Alderman Muirhead responded.

Mr. G. Watson Gray, in proposing the toast of "The Institute," said that he did so with equal admiration for its aims and performances. If the country was to advance with other countries, it required not only a fighting army, but an army of chemists. To the Institute fell the duty of testing,

and enrolling the chemical army. Like other armies the chemical army had different units : it consisted of professors of chemistry, and analytical, consulting, technological and research chemists ; these might be further sub-divided, but all were necessary to the well-being and advancement of chemical and allied sciences. No one could determine the dividing lines between the sciences : chemistry was so closely connected with physics and other branches of science that the chemist had to know something about everything and everything about chemistry. The Institute had so laid down its courses of training and so conducted its examinations that the members had to fulfil those qualifications. The Institute was performing a great public service by hall-marking men who could be relied on to perform their duties in an efficient manner for the public benefit. The public had been led to believe that the German chemist was the chemist *par excellence*, and that the British chemist was very small fry. Statements made by a leading K.C. in a recent criminal case tended to foster that impression ; but he (Mr. Gray) was emphatic in the opinion that British chemistry was at least equal to that of any other country, and that it was in a large measure due to the untiring work and accomplishments of the Institute that British chemical science stood in such a high position as it did. Mr. Watson Gray paid a high tribute to the leadership of Sir Herbert Jackson, whose absence he greatly regretted.

The Registrar, replying for the Institute, expressed his great pleasure in visiting the Liverpool Section and in meeting its members again. He said that the Council appreciated very highly the good work of the Section, and that he knew the President was keenly disappointed not to be present. The position of the Institute as the representative body of chemists had become firmly consolidated during recent years. Referring to the remarks of Mr. Watson Gray, he (the Registrar) held that the Institute represented a body unique in its high standard both of general and professional attainments. He was very proud to be Registrar of the Institute whose members

had rendered such great service to the country during the times of stress. The profession had shown its readiness to devote its attention to the arts and industries of peace. It was probably in a more settled condition than any other ; at the Armistice the Institute, in common with all other professional bodies, had been faced with the problem of resettlement, but at the present time, only a very few of its members were without appointment. He was glad to be accompanied by the Assistant Secretary, and to have an opportunity of telling the Section of his loyal and helpful work on behalf of the Institute.

Mr. E. H. Shepherd submitted the toast of "The Ladies," to which Mrs. Roberts replied ; and Mr. Alfred Smetham proposed "Our Guests." The Assistant Secretary, in reply, thanked the Section for its welcome and its generous hospitality, remarking how much he valued the opportunity of meeting members whose acquaintance he had not previously made. He also conveyed greetings and good wishes from the London Section Committee.

Prof. C. O. Bannister proposed "The Liverpool Section and its Chairman," to which Mr. Roberts briefly responded, at the same time calling for a vote of thanks, which was heartily accorded the artists—Miss Jean McMurray and Mr. Lloyd Moore (vocalists), Mr. F. W. Hughes (violin), and Mr. Alexander Kennedy ('cello)—who had very kindly contributed to the enjoyment of the evening by providing a programme of excellent music, and to Mr. John Hanley, the Hon. Secretary of the Section, who had not only been mainly responsible for the arrangements for the dinner, but also officiated as accompanist.

London and South Eastern Counties Section.—On 30th November the Section held an informal dinner at the Bedford Hotel, Southampton Row, and subsequently a meeting at the Institute, when Mr. William Macnab delivered a very interesting address on French Explosive Factories in war time. The address was illustrated by excellent lantern slides, and Mr. Macnab demonstrated clearly the enormous development of the explosives industry effected by our allies,

At the conclusion a number of questions were put and answered, and a very cordial vote of thanks was passed to Mr. Macnab on the motion of Mr. Kirkaldy, the Chairman.

Newcastle-upon-Tyne North-East Coast Section.

—The second Annual Meeting of the Section was held on Monday evening, 29th November, in the rooms of the Chemical Industry Club.

The Committee for the ensuing session was appointed as follows :—Dr. J. T. Dunn (Chairman) ; Dr. Alexander Fleck (Treasurer) ; Prof. P. P. Bedson, Mr. C. H. Ridsdale, Dr. J. E. Stead, Mr. C. J. H. Stock, Mr. Thomas Wallace ; Dr. J. H. Paterson (Secretary).

Dr. Dunn read the financial statement for the previous session, showing a balance in hand of £13 10s. 7d.

The following programme of meetings was agreed upon :—

December 17th, 1920 : Dinner, Newcastle.

January 25th, 1921 : Ordinary Meeting, Newcastle.

February 24th, 1921 : Dinner, Darlington.

March 22nd, 1921 ; Ordinary Meeting, Newcastle.

April 28th, 1921 : Ordinary Meeting, Newcastle.

A debate was held on the question of the Register of Chemical Assistants. It was decided to send a letter to the Registrar pointing out the complete lack in the district of technical schools affording an evening class curriculum approved by the Institute, and indicating certain anomalies which would arise in works laboratories owing to the institution of this Register.

South Wales Section.—The Annual General Meeting was held at Swansea on 20th November, when the Officers and Committee were elected.

Mr. F. J. Bloomer presided ; the Hon. Secretary reported on the work of the past year, and matters of general interest to the Section were discussed.

Mr. Shelton was re-elected Hon. Secretary and Treasurer ; Mr. T. Eynon Davies was re-elected to the Committee ; and Prof. J. E. Coates, of University College, Swansea, was elected to the Committee.

Papers to be read during the ensuing session have been promised by Mr. J. W. Adye, Mr. C. A. Seyler, and Prof. Coates.

The Hon. Secretary will be glad to hear from any Fellow or Associate moving to the District.

Personal.

Mr. C. S. Gibson has relinquished the position of Professor of Chemistry in the Egyptian Government School of Medicine at Cairo, on his appointment to the University Chair of Chemistry at Guy's Hospital Medical School.

The Copley Medal of the Royal Society has been presented to Dr. Horace T. Brown, F.R.S.

Officers' Resettlement Committee.—Appointed by the Ministry of Labour in August, 1918, the Officers' Resettlement Committee, which was concerned with the early plans for demobilisation and resettlement of officers and men of similar standing, has now been dissolved. Dr. Macnamara has appointed, under the chairmanship of Lord Haig, a Joint Committee of the Officers' Association (with which most of the Voluntary Associations have now become amalgamated) and the Appointments Department, which will absorb the work of the previous Committee and will seek advice when necessary from the representatives of the learned societies and the professions who are serving on the Grants Committee at Headquarters, and on the District Interviewing Boards under the same Department.

Dr. Macnamara in informing the Institute of the dissolution of the Officers' Resettlement Committee has acknowledged its valuable services in the early stages of resettlement; he has expressed appreciation of the work of the Registrar for that Committee and satisfaction that the Ministry still retains his assistance on the Grants Committee.

Obituary.

ALEXANDER CUNNINGHAM, died, after an operation, at Chryston, Glasgow, on 18th October, in his 32nd year. Educated at Gorgie Public School and George Heriot's School, he was trained under Dr. John Gibson, at Heriot-Watt College, Edinburgh, passed the Intermediate Examination of the Institute in April, 1910, and was works chemist for two years with Messrs. John Cox, Ltd., Glue Manufacturers, at Gorgie Mills, Edinburgh, before passing the Final Examination for the Associateship in the branch of Organic Chemistry, in July, 1913. He then obtained an appointment with Messrs. James Calder and Co., Distillers and Yeast Makers, of Bo'ness and Garloch, with whom he was engaged when he enlisted in November, 1914, in the Lothian and Border Horse, being transferred after a year's service to H.M. Factory, Oldbury, where he continued until the end of the war. He was elected a Fellow in 1916.

JAMES WRIGHT GATEHOUSE died at Bath, on 16th October, 1920. He received his training in chemistry under Prof. Denman and after teaching for six years at the Hereford Proprietary School, established in 1870 a practice at Bath, as successor to Mr. Benjamin Nickels, while he continued for some years to teach in the Somersetshire and Bath Proprietary Colleges and at the Bath Royal United Hospital. In 1876 he was appointed Public Analyst for the city and county borough of Bath, which position he held until 1918. He was the author of various papers published in *The Analyst*, *The Chemical News*, and *The Photographic News*. He was elected a Fellow of the Institute in 1878.

THOMAS SIDNEY HAINES, died at Ealing in his 32nd year. Educated at Blackrock College, Dublin, he received his scientific training at King's College, London, passed the Intermediate Examination of the Institute in 1909 and the Final Examination for the Associateship in the Chemistry of Food and Drugs, etc., in 1910. He then entered the Laboratory of Mr. Edward Russell, Public Analyst for Bristol. In 1911 he passed the Examination of the Institute in Biological Chemistry, and in 1913 joined Mr. Cyril Dickinson, Public Analyst for Southwark, with whom he remained until early in 1919, when he received an appointment in the laboratories of Messrs. Allen and Hanbury, which he held at the time of his death. He was elected a Fellow of the Institute in 1913.

JOHN EMILIUS LANCELOT SHADWELL, died at Bath on the 3rd December, 1919, in his 77th year. Educated at Shrewsbury School, he was elected in 1861 to a Junior Studentship at Christchurch, Oxford, he was Ireland Scholar in 1864 and Craven Scholar in 1865, when he graduated with First Class Honours in Classics. In the following year he was elected to a Senior Studentship which he held until 1887. In 1869 he was called to the Bar and practised for a short time in Lincoln's Inn, but he relinquished that profession to enter the Royal College of

Chemistry in London and continued research in Germany for seven years, working under Kolbe, Wiedmann, Bunsen and Kekulé. While at Bonn he investigated, in conjunction with Claisen, the synthesis of pyruvic acid and of isatin, published in the *Berichte*. He also worked on Crystallography under Groth at Strassburg; and in 1880, at the time of his election as a Fellow of the Institute, he was working with Sir Edward Frankland. Subsequently he continued research, mainly in organic chemistry, in his private laboratories at Melksham and Bath, the results being contributed to various British and foreign journals.

ADOLPH URICH was born in the Island of Trinidad in 1850. He was trained under Fehling in the Royal Polytechnic at Stuttgart, under Hofmann at the University of Berlin, and under Bunsen and Kopp at the University of Heidelberg, at which last-named University he took the degree of Ph.D. in 1872. From 1873 to 1876 he acted as Assistant to Prof. E. Schulze, Professor of Agricultural Chemistry at the Polytechnic, Zurich, with whom he published papers: "Über die Stickstoffhaltigen Bestandteile der Futterrüben" and "Über die Zusammensetzung des Wollfetts." Subsequently, having acted as analyst for several beet sugar factories in Germany, he returned to the West Indies, and after some experience in Demerara, became consulting chemist to the sugar estates of Messrs. Gregor Turnbull & Co., in Trinidad. From time to time he acted temporarily as Government Analyst in the Colony and as Professor of Chemistry in the Royal College. In 1891 and 1892 he was engaged for a period on the Gulah Estate at Perak, Federated Malay States, but returned to Trinidad and resumed his previous position, the company being now known as The Trinidad Shipping and Trading Co., with whom he remained until his death on 11th September, 1920. He was elected a Fellow of the Institute in 1892.

LEONARD PHILIP WILSON died after an operation for appendicitis, on 16th October, in his 42nd year. Educated at St. Dunstan's College, Catford, he gained a Clothworkers' Scholarship to the City and Guilds Central Technical College, and obtained the Associateship of the College in 1899, when he was elected Leathersellers' Research Fellow. In 1901 he became Chemist to Messrs. Wilkinson, Heywood and Clark, attached at first to their Oil Works, and in 1903 to their Varnish Works. In 1905, he was engaged with the Vacuum Oil Co., and in 1906 joined the scientific staff of Messrs. Courtaulds, Limited, at Coventry, with whom he remained until his death. In 1912 he was elected a Fellow of the City and Guilds of London Institute in recognition of his original and valuable research work, particularly his contributions to the advancement of the artificial silk industry. He contributed papers to the Chemical Society, the Society of Chemical Industry, and the British Association, and his name was associated with many patents connected with artificial silk. He served on the Patents Committee of the Association of British Chemical Manufacturers, and as Chairman of the Birmingham Section of the Society of Chemical Industry, of which Society he was a Vice-President. He was elected a Fellow of the Institute in 1918.

Examinations.

Biological Chemistry, Bacteriology, Fermentation and Enzyme Action.

Two candidates were examined, in this Branch, for the Associateship in October, and passed :—

Dundale, Clarice Margaret (Nat. Sci. Tripos, Cambridge), Newnham College ; and Government Laboratory.

Elliott, Frank Larriston, King's College, London ; Birkbeck College ; S.W. Polytechnic ; and Scientific Department, Imperial Institute.

The following papers and exercises were given.

MONDAY, 25th OCTOBER : 10 a.m. to 1 p.m.

1. Write a short account of the enzymes of oxidation and reduction, indicating their mode of action and giving instances of biochemical changes in which they are concerned.

2. Give an account of the nature of colloidal solutions with special reference to solutions of proteins. What is the meaning of the terms, adsorption, iso-electric point, denaturation, ultra-filtration ?

3. Give an account of the structure and life-history of (a) a typical bacillus, (b) a yeast.

What methods are at our disposal for the identification of organisms belonging to these two classes ?

4. Write a short essay on one of the following subjects :

(a) The colouring matters of flowers.

(b) Disinfection.

(c) The nucleic acids.

TUESDAY, 26th OCTOBER, 1920 : 10 a.m. to 4.30 p.m.

1. Prepare a specimen of Edestin from the sample of ground Hemp Seed (A) supplied. Submit your product to the examiner and ascertain its behaviour towards the usual protein tests.

This exercise may be continued on the subsequent days of the examination.

2. The sample of water (B) contains a metallic contamination (zinc). Ascertain its nature and determine its amount, expressing your result in parts of metal per 100,000.

WEDNESDAY, 27th OCTOBER, 1920 : 10 a.m. to 4.30 p.m.

3. Determine the carbolic coefficient of the liquid disinfectant (C) using the culture supplied as test organism (B. coli).

This exercise may be continued on the subsequent days of the examination.

THURSDAY, 28th OCTOBER, 1920 : 10 a.m. to 4.30 p.m.

4. The solutions (D) and (E) contain different concentrations of the same proteolytic enzyme. Ascertain the nature of the enzyme (trypsin) and make experiments to determine the relative enzymic concentrations of the two solutions.

This exercise may be completed on Friday.

FRIDAY, 29th OCTOBER, 1920 : 10 a.m. to 4.30 p.m.

5. Examine and report as fully as you can on the cultures (F), (G), (H), and (J). Submit all stained specimens to the examiner and make drawings of the various organisms.

TRANSLATION.

(Time allowed : 2 Hours.)

Translate into English :

En général tous les carbures d'hydrogène gazeux présentent les caractères communs suivants : ils brûlent dans l'oxygène, ou dans l'air, avec une flamme plus ou moins éclairante, selon la proportion de carbone qu'ils renferment. Cette combustion donne naissance à de l'eau et à de l'acide carbonique : presque toujours aussi à de l'oxyde de carbone.

Lorsque la combustion est incomplète, il se forme de l'acétylène : c'est ce qui arrive, par exemple, lorsqu'on enflamme, à l'orifice d'une éprouvette étroite, un carbure d'hydrogène non mêlé d'air. Il se produit aussi quelquefois un léger dépôt de charbon.

Lorsque l'étincelle électrique jaillit dans un carbure d'hydrogène, et en général dans une vapeur carbonée quelconque, elle donne toujours naissance à de l'acétylène.

Ces deux réactions permettent de déceler avec la plus grande précision l'existence simultanée du carbone et de l'hydrogène dans un gaz.

Voici comment on peut procéder. Soit d'abord la réaction par combustion.

Le gaz inflammable est mélangé avec un peu d'air (pas assez pour que l'explosion soit violente), et allumé à l'extrémité d'une petite éprouvette tenue verticalement, l'ouverture en haut. Immédiatement après la combustion, on verse dans l'éprouvette un peu d'eau de chaux, et l'on agite en fermant l'orifice avec la paume de la main : si le gaz contenait du carbone, l'eau de chaux donne un trouble ou un précipité soluble dans les acides. Dans le cas où le précipité formé tout d'abord se redissout ensuite de lui-même, on ajoute un excès d'eau de chaux.

Pour savoir si le gaz contient aussi de l'hydrogène, il suffit d'observer si les parois de l'éprouvette se sont recouvertes d'une buée de vapeur d'eau : cette constatation se fait mieux en opérant sur le gaz non mélangé d'air.

Traité Pratique de l'Analyse des Gaz.

M. BERTHELOT.

Translate into English :

Der beigemengte Alkohol haftet dem Aether höchst hartnäckig an ; man kann ihn durch sehr oft wiederholtes Schütteln mit immer erneuten kleinen Mengen von Wasser entfernen. Um ganz wasser- und alkohol-freien Aether zu erhalten, lässt man das Präparat nach dem Ausschütteln mit Wasser und dem Trocknen mit Chlorcalcium noch etwa 12 Stunden über dünnen Natriumscheiben oder Natriumdraht stehen und destilliert dann aus dem Wasserbade ab.— Auf einen Wassergehalt kann man durch Schütteln mit dem gleichen Volum Schwefelkohlenstoff prüfen : bei wasserfreiem Aether tritt keine Trübung ein. Auf Zusatz von metallischem Natrium entwickelt auch der reinste Aether etwas Gas in feinen Bläschen ; das Gas stammt aber nicht aus dem Aether, sondern aus dem Natriumhydroxyd, mit dem sich das Natrium an der Luft augenblicklich überzieht ; daher hört bei reinem Aether die Gasentwicklung bald auf, und das Natrium bleibt blank, während in feuchtem Aether von vornherein grosse Gasblasen auftreten und sich das Metal mit einer weissen Kruste überzieht.—Ein Alkoholgehalt zeigt sich beim Schütteln mit etwas essigsauren Rosanilin : wasser- und alkohol- freier Aether färbt sich nicht mit diesem Reagens. Die Handelspräparate enthalten ferner meist kleine Mengen Acetaldehyd CH_3CHO , den man mit Hülfe des Nesslerischen Reagens (Bildung eines roten, quecksilberhaltigen Niederschlags) oder Ammoniak (Entstehung von unlöslichem Aldehydammoniak) nachweisen und durch 24-stündige Einwirkung alkalischer Permanganatlösung zerstören kann.

MEYER-JACOBSON.

Mr. Harry Alan Taylor, Government Laboratory, Hong-kong, has passed the Examination in the Chemistry of Food and Drugs, &c., and has been duly elected to the Associateship of the Institute.

Books and their Contents.

- “Carbohydrates and Alcohol.” Samuel Rideal and Associates. Pp. xv. and 219. (London: Bailliere, Tindall & Cox.) 12s. 6d. net.
Starch and its products; sugar; alcoholic fermentation; beer; wine; distillation; vinegar.
- “Experimental Basis of Chemistry.” Ida Freund. Pp. xvi. and 408. (Cambridge University Press.) 30s. net.
The nature and recognition of chemical change; the classification of substances into complex and simple; classification of complex substances into mixtures and compounds; the part which air plays in combustion; the conservation of mass; the law of fixed ratios; the law of multiple ratios; the law of permanent ratios; the law of equivalent weights; the law of combining volumes.
- “Imperial Institute Monograph on Mineral Resources: The Platinum Metals.” A. D. Lumb. (London: John Murray.) Pp. 63. 3s. 6d. net.
Occurrence; sources of supply.
- “Interpretation of Radium and the Structure of the Atom.” Frederick Soddy. Pp. xvi. and 260. 4th Edition. (London: John Murray.) 15s. net.
- “Laboratory Manual of Organic Chemistry.” H. L. Fisher. Pp. x. and 331. (New York: John Wiley & Son, Inc.; London: Chapman & Hall, Ltd.) 12s. 6d. net.
Part I.: Laboratory Experiments. Part II.: Organic Combustion.
- “Manufacture of Chemical Manures.” J. Fritsch. Translated from the French. 2nd Edition, revised by H. B. Stocks. Pp. 395. (London: Scott, Greenwood & Son.) 15s. net.
- “Molinari’s Chemistry.” 2nd Edition. Vol. II., Part I: Organic. T. H. Pope. Pp. xv. and 456. (London: J. & A. Churchill.) 30s. net.
Vol. I.: General. Vol. II.: Derivatives of methane; AA. hydrocarbons; BB. halogen derivatives and hydrocarbons; CC. alcohols. DD. derivatives of alcohols; EE. acids; FF. derivatives of acids;

- “Notes on Foundry Practice.” J. J. Morgan. Pp. viii. and 126. (London : Charles Griffin & Co. Ltd.) 4s. 6d.

Pig- or cast-iron ; grading of pig-iron ; analyses of pig-irons ; grade and chemical composition ; specification of American foundry iron, scrap ; shrinkage ; changes due to remelting ; moulding sands ; openers ; binders ; facings ; foundry furnaces ; crucible, reverberatory, cupola ; mixing ; mixing by analyses ; foundry tools ; moulding ; open sand moulding ; green sand moulding ; plate moulding ; dry sand, loam, and bench moulding ; moulding machines ; castings ; chilled, malleable, steel, brass, bronze, etc.

- “Organic Chemistry for Advanced Students.” J. B. Cohen. 3rd Edition. (London : Edward Arnold.) Part I. : Reactions. Pp. viii. and 366. 18s. net. Part II. : Structure. Pp. vii. and 435. 18s. net.

Physical properties and structure ; colour and structure ; isomerism and stereo-isomerism ; geometrical isomerism ; stereo-chemistry and nitrogen ; isomeric change ; benzene theory.

Part III. : Synthesis. Pp. vii. and 378. 18s. net.

Carbohydrates ; fermentation and enzyme action ; purine group ; proteins ; terpenes and camphors ; the alkaloids.

- “Organic Chemistry for Intermediate Science Students.” A. Killen Macbeth. Pp. xi. and 233. (London : Longmans, Green & Co.) 6s. 6d. net.

- “Physico-Chemical Tables.” J. Castell-Evans. (London : Charles Griffin.) 2 volumes.

Vol. I. : pp. xxxii. and 548, 36s. net ; Vol. II. ; pp. xiv. and 549-1235, 45s. net.

Vol. I. : Chemical engineering and physical chemistry. Vol. II. : Chemical Physics, pure and analytical chemistry.

- “Plantation Rubber and the Testing of Rubber.” G. Stafford Whitby. Monograph on Industrial Chemistry. Pp. xvi. and 560. (London : Longmans, Green & Co.) 28s.

Part I. : Preparation of plantation rubber. Part II. : Testing of rubber ; the stress strain relations ; technique of tensile tests ; technique of vulcanisation testing ; comparison of raw rubber samples ; stability of state of cure ; technical mixes ; viscosity determinations ; cycle of extension and retraction ; hysteresis ; relation, thermal, optical and electrical to the mechanical behaviour ; Poissan's ratio ; bibliography.

- “Practical Biological Chemistry.” G. Bertrans and P. Thomas. Translated from the 3rd edition by H. A. Colwell. Pp. xxxi. and 348. (London : G. Bell & Sons.) 10s. 6d. net.

Part I. : Statics ; detection and estimation of elements ; chief incombustible groups ; glucose groups and hydrolysable sugars ; mannitols ; higher polysaccharides ; glucosides ; fatty acids ; aromatic acids ; fats and glycerol ; essential oils ; alkaloids ; proteins.

- “Practical Physiological Chemistry.” S. W. Cole. 6th Edition. Pp. 420. (Cambridge : Heffer & Sons.) 16s. net.

- “Recent Advances in Physical and Inorganic Chemistry.” A. W. Stewart. 4th edition. Pp. xii. and 286. (London : Longmans, Green & Co.) 18s. net.

Electric furnace and some of its products ; the condensation of nitrogen, peroxides and peracids ; observation spectra ; X-rays and crystal structure ; X-ray spectra and atomic numbers ; rare earths ; radio-activity ; isotopes ; periodic law.

- “Recent Advances in Organic Chemistry.” A. W. Stewart. 4th edition. Pp. xvi. and 359. (London : Longmans, Green & Co.) 21s. net.

Monocyclic terpenes ; dicyclic terpenes ; olefinic terpenes ; rubber ; the alkaloids ; polypeptides ; chlorophyll ; the anthocyanins ; some theories of natural synthesis and vital products ; tervalent carbon ; other elements which exhibit abnormal valency.

- “Volatile Oils.” E. Gildemeister and Fr. Hoffmann. 2nd Edition, written under the auspices of Schimmel & Co. 2nd Volume (Vol. I. published in 1913). Pp. xx. and 686. (London : Longmans, Green & Co.) 32s. net.

The oils derived from the chlorophyceae, eumycetes, embryophyta asiphonogama ; embryophyta siphonogama.

Changes in the Register.

At the meetings of the Council held on 29th October and 26th November, 1920, one Fellow was re-elected, 4 Associates were elected to the Fellowship, and 64 new Associates were elected, and 76 students were admitted.

The Institute has lost 5 Fellows by death.

Fellow Re-elected.

Kenyon, Joseph, D.Sc. (Lond.), Battersea Polytechnic, London, S.W. 11.

Associates Elected to Fellowships.

Clarke, Arthur Leslie Rimmer, B.Sc. (Lond.), c/o Cia Mexicana de Petroleo, El Aquila, S.A., La Refineria, Minatitlan, Ver., Mexico.
 Gilmour, Hugh, 42, Trafalgar Road, Moseley, Birmingham.
 Masson, James Irvine Orme, M.B.E., D.Sc. (Melb.), University College, Gower Street, W.C.1.
 Rogers, Sidney John, B.Sc. (Lond.), 137, Clements Road, East Ham, London, E.6.

New Associates (by Examination).

Dugdale, Miss Clarice Margaret, 145, Rake Lane, Liscard, Cheshire.
 Elliott, Frank Larriston, 40, Arundel Gardens, Notting Hill Gate, London, W.11.
 Taylor, Harry Alan, Imports and Exports Office, Hong Kong.

New Associates.

Adan, Laurence Hay Watt, M.A., B.Sc. (Aberd.), Lea-rig, Cults, Aberdeenshire.
 Anderson, George James William, Dr. Ing. (Hanover), 2, Wickham Road, Brockley, London, S.E.4.
 Balaban, Isidore Elkanah, B.Sc. Tec. (Manc.), 7, Devonshire Street, Higher Broughton, Manchester.
 Barclay, Alexander, A.R.C.S. (Lond.), 59, Cross Oak Road, Berkhamsted, Herts.
 Beckley, Verey Alfred, B.A. (Cape of Good Hope), M.A. (Cantab), Waverley, Belvedere, Kent.

- Beetlestone, Norris Charles, B.Sc. (Lond.), Langside, Purley Park Road, Purley, Surrey,
 Birch, Geoffrey Longworth, A.R.C.S., 6, Scarth Road, Barnes, London, S.W.
 Bird, Reginald Robert, B.Sc. (Bris.), 217, Newport Road, Cardiff.
 Bloom, Edward, B.Sc. (Lond.), 15, Lilybank Place, Aberdeen.
 Branson, Victor Cecil, M.C., A.R.C.S., 97, Woodward Road, London, S.E.22.
 Browne, Miss Agnes, B.Sc. (Lond.), A.R.C.S.I., c/o Mrs. Nunn, 79, Stockwell Park Road, London, S.W.9.
 Burnett, Robert Alexander, M.A., B.Sc. (Aberd.), 7, Roseneath Terrace, Edinburgh.
 Callendar, Leslie Hugh, A.R.C.S., 49, Grange Road, Ealing, London, W.5.
 Clarke, John George, M.A., B.Sc. (St. Andrews), Farmfield House, Causeway Green Road, Longley Green, Birmingham.
 Coutie, Alexander, B.Sc. (Edin.), 4, Priestfield Road, Edinburgh.
 Craven, Mrs. May Bradger, M.Sc. Tech. (Manc.), 10, Birch Road, Rusholme, Manchester.
 Dey, Manik Lal, M.Sc. (Calcutta), Chemical Inspector's Naini Tal, U.P., India.
 Dixon, Bertram Eastwood, A.C.G.F.C., 4, Gunton Road, Upper Clapton, London, E.5.
 Evans, William John Roy, B.Sc. (Wales), Sunnyview, Pont Road, Dowlais, Glam.
 Fletcher, Louis, 50, Viewforth Terrace, Edinburgh.
 Gilmore, Miss Emmeline Clara, A.R.C.S.I., Glen Lea, Bradford Road, Fartown, Huddersfield.
 Grantham, Donald Ronert, M.C., A.R.C.S., 139, Wakeman Road, Kensal Rise, London, N.W.10.
 Greenstreet, Victor Robert, A.C.G.F.C., 56, Clifton Road, Church End, Finchley, London, N.3.
 Harold, Frederick Clarkson, 10, Regent's Park, Exeter.
 Hickinbottom, Wilfred John, B.Sc. (Birm.), 46, Frederick Road, Stechford, Birmingham.
 Hird, Samuel Arnold, c/o H. P. Hird, Esq., Moor End, Lighthouse, Dewsbury.
 Hooley, Leonard Joseph, B.A. (Cantab), Corpus Christi College, Cambridge.
 Hudson, Ronald William Austen, A.R.C.S., 68, Greenvale Road, Eltham, London, S.E.9.
 Hughes, Ednyfed Wynne, M.Sc. (Manc.), Secondary School, Hadleigh, Suffolk.
 Ingham, Harry, M.Sc. (Vict.), 17, Cobden Road, Chesterfield.
 King, Frederick John, A.C.G.F.C., Oakhurst, Stanley Avenue, Wembley, Middlesex.
 Lawson, George Ramsay William, Stakes, Westerham, Kent.
 Lumsdaine, Miss Helen Affleck, M.A., B.Sc. (Edin.), 23, Sciennes Road, Edinburgh.
 Lupton, Henry Preston, B.Sc. (Leeds), 7, Scott Park Road, Burnley, Lancs.

- Mertens, Henry Francis Orlando, A.R.C.S., 103, Park Street, Regent's Park, London, N.W.1.
- Mitchell, Claude Alexander Dunbar, B.A. (Oxon.), 24th Devon Regt., c/o Secretary for Health, Civil Commissioner's Office, Baghdad, Mesopotamia.
- Moran, Thomas, B.Sc. (Liv.), 23, Janet Street, Liverpool.
- Occleshaw, Vincent Joseph, M.Sc. (Liv.), 22, Bryn Street, Ashton-in-Makerfield, nr. Wigan, Lancs.
- Overell, Frank Herbert, A.R.C.S., 107, Florence Road, Wimbledon, London, S.W.19.
- Platnauer, Joseph Bertram, M.C., B.Sc. (Cape Town), 83, Parrock Street, Gravesend, Kent.
- Price, Thomas Brychan, M.C., B.Sc. (Wales), 93, Allensbank Road, The Heath, Cardiff.
- Rendall, Arthur Geoffrey, A.R.C.S., Deepdene, 56, Central Hill, Upper Norwood, London, S.E.19.
- Roberts, Hugh Medwyn, B.Sc. (Wales), Frondon, Crescent Road, Rhyl, N. Wales.
- Roberts, Idris Cheer, B.Sc. (Wales), Bryn Eglwys, Holyhead Road, Bangor.
- Rowell, William, B.Sc., A.R.C.S. (Lond.), 12, Dudley Road, Grantham.
- Salt, Harold, B.Sc. (Leeds), 36, Oak Street, Accrington, Lancs.
- Sarangdhar, Vinayak, Milkanth, M.A., B.Sc. (Bombay), c/o The Tata Iron & Steel Co., Ltd., Jamshedpur, *via* Tatanagar B.N. Railway, India.
- Saunders, Horace Leonard, B.Sc. (Wales), 177, Chepstow Road, Newport, Mon.
- Sayburn, Matthew James, M.Sc. (Dun.), 10, Lesbury Street, Lemington-on-Tyne.
- Smith, Alexander Martin, B.Sc. (Edin.), 13, Viewforth Gardens, Edinburgh.
- Stewart, Corbet Page, B.Sc. (Dun.), Dept. of Chemistry, The University, Edinburgh.
- Thompson, Harold, M.A., B.Sc. (Aberd.), 114, Conniston Road, Edinburgh.
- Twist, Herbert, B.Sc. (Manc.), Normanhurst, Hightown, Castleford, Yorks.
- Vaughan, Reginald Edward, A.R.C.S., Woburn, Maidenhead, Berks.
- Wallace, Miss Janet Adam, B.Sc. (Glas.), 52, Low Glencairn Street, Kilmarnock.
- Walls, Noel Stanley, B.Sc. (Manc.), 45, Platt Lane, Hindley, nr. Wigan.
- Whitmore, Charles James Richard, M.A. (Cantab.), The Cambridge and County School, Hills Road, Cambridge.
- Williams, Ewart Harrod, A.C.G.I., 31, Thornsbeach Road, Catford, London, S.E.6.
- Woods, Norman Edward, A.R.C.S., St. Sunniva, Grand Drive, Raynes Park, Surrey.
- Woollard, Richard Pargeter, A.R.C.S., 175, The Grove, Denmark Hill, London, S.E.5.
- Worsdale, John Everard, A.R.C.S., 6, Park Road, Park Street, Hull.

New Students.

- Ashman, Harold, 8, High Street, Netherton, nr. Dudley.
 Baker, Charles Frederick, 88, Hertford Road, East Finchley, London, N.2.
 Bates, Victor Edward Lionel, 397, Northampton Buildings, Clerkenwell, London, E.C.1.
 Belcher, Kenneth Booth, 57, Purley Vale, Purley, Surrey.
 Bennett, Miss Hilda, 43, Bark Plave, London, W.2.
 Begelstone, Herbert James, 24, Freehold Street, Loughborough, Leicestershire.
 Black, Munro David, Kinnoull, Busby, nr. Glasgow.
 Blackie, Joseph John, c/o Messrs. Duncan, Flockhart & Co., 104, Holyrood Road, Edinburgh.
 Blunsden, Archibald Beresford, Glendower, 45, Monk Road, Bishopston, Bristol.
 Bray, Charles William, Moor Lane, Southwell, Notts.
 Broughall, Laurence St. Claire, Woodview, Hadley, Barnet, Herts.
 Brown, Francis Leonard Robert, 10, Coverdale Road, London, W.12.
 Bryan, William Stanger, 22, Faircross Avenue, Barking, Essex.
 Carroll, Michael Francis, 167, Upper Wickham Lane, Welling, Kent.
 Cawston, David George, 16, Highbury Crescent, London, N.5.
 Conolly, Edward John Venn, 36, Appleton Gate, Newark, Notts.
 Cooke, Arthur Arnold, c/o Mrs. Haigh, 14, Upper George Street, Huddersfield.
 Corran, John William, 86, Upper Hill Street, Princes Park, Liverpool.
 Cotton, Frank Harriss, 30, Fairfield Road, Crouch End, London, N.8.
 Coull, James, 2, Park Road, Aberdeen.
 Craddock, Thomas John, 38, Bushey Hill Road, Camberwell, London, S.E.5.
 Cunningham, Stanley William Branch, 9, Lewis Terrace, Haymarket, Edinburgh.
 Deering, Ernest Charles, 7, Graeme Road, Baker Street, Enfield.
 Diamond, Albert Victor, 37, Claribel Street, Liverpool.
 Dodds, George Patrick, 42a, Bravington Road, Harrow Road, London, W. 9.
 Evans, Urien Ceri, 28, Muncaster Road, London, S.W.11.
 Everett, John Garwood, 151, Praed Street, Paddington, London, W.2.
 Franklin, Reginald George, 28, Parkhurst Road, Holloway, London, N.7.
 Garrad, Harold James, 102, Nortoft Road, Bournemouth.
 Godby, William Alfred, 77, Blondel Street, Battersea, London, S.E.11.
 Handley, Philip George, 133, Park Lane, Stoke Newington, London, N.16.
 Harrison, Alan Cobden, Park Lodge, Park View Southall, Middlesex.
 Harrold, Wilfred George, University College Hall, Ealing, London, W.5.
 Hicks, Robert Haxwell, 65, Romilly Road, Canton, Cardiff.
 Holland, Hubert Ernest, Cumbria, Station Road, Hayes, Middlesex.
 Holmes, Albert Baden, Killygardon, Mossfield Road, King's Heath, Birmingham.
 Hudson, Henry Ralph, Westgate, North Cavem, East Yorks.
 Hutchinson, Christopher West, Coombehurst, Winscombe, Somerset.

Ibison, Austin, 79, Eastbourne Road, Birkdale, Lancs.
 Jack, John Will, 79, Wroughton Road, Battersea, London, S.W.11.
 Jahans, Gordon Alexander, 26, Hampton Park, Redland, Bristol.
 Johnson, Edgar Bertie, 32, Alcester Road, Moseley, Birmingham.
 Keenan, Henry Wilfrid, 58, Upper Clapton Road, London, E.5.
 King, George, 51, Lady Bay Road, West Bridgford, Notts.
 Long, Hubert Kildare, 2, Chiltern Manor, Wargrave, Berks.
 Love, Malcolm McFarlane, 28, Caledonia Street, Paisley, Scotland.
 Mattingley, Fred, 4, Carn Brea, Bath Road, Margate.
 Melhuish, Barradale Whiddon, 137, Sloane Street, London, S.W.1.
 Meston, Frederick William Henry, 42, Cowan Road, Edinburgh.
 Mieras, Adrian Pieter, 28, Breaver Hall Road, Edinburgh.
 Mosley, Martin Aaron, 3, Rylands Road, Beeston, Notts.
 Parry, Brian Berey, 20, Etnam Street, Leominster.
 Philip, George Gilmour, 199, High Street, Portobello, Edinburgh
 Philp, James Leith, 4, Victoria Gardens, Kirkcaldy, Fife.
 Randerson, William, 158, Wincheap, Canterbury.
 Rattray, Edwin John Thomas, The Manse, West End Road, Haydock,
 St. Helens, Lancs.
 Ridgway, Leslie Randal, Glent Mount, Staylbridge.
 Robinson, Arthur, 157, Church Street, Pendleton, Manchester.
 Samson, Abraham, 85, Melrose Avenue, Cricklewood, London, N.W.2.
 Shaw, Miss Elsie, 37, Dudley Road, Whalley Range, Manchester.
 Shilling, William George, The Mill, Preston Village, Faversham.
 Stitt, Donald Douglas, 85, Cromwell Road, Crosshill, Glasgow.
 Tankard, Joseph, 11, Constance Road, Deane, Bolton.
 Thomas, Miss Elsie Margaret, 21, Liscard Road, Wavertree, Liverpool.
 Thomson, Douglas, Chapel of Craibstone, Bucksburn, Aberdeenshire.
 Thorp, Edwin William, Thruxton, Tennyson Road, Bognor, Sussex.
 Torkington, Sidney, 9, Milton Place, Ashton-under-Lyme, Lancs.
 Townsend, Harry, 6, Park Road West, Crosland Moor, Huddersfield.
 Ward, Allan Miles, Bridge Street, Walton-on-Thames, Surrey.
 Ward, Harold George, Tresco, Cornwall Road, Sutton, Surrey.
 Webster, Alec., 34, Kelso Road, Belle Vue Road, Leeds.
 Westlake, Eric Hall, 23, Westgate, Almondbury, Huddersfield, Yorks.
 Whitkeld, Leonard Fairfax, Mount Side Cottage, Sudbury Hill, Harrow-
 on-the-Hill.
 Wilson, Harold Frederic, 16b Kennington Oval, London, S.E.11.
 Wooldridge, Lennox Charles, 42, Moylan Road, Fulham, London,
 S.W.6.
 Yeates, Reginald Leslie, 7, Stopford Road, Upton Manor, London, E.13.

DEATHS.

Fellows.

Alexander Cunningham.
 Thomas Sidney Haines.
 Archibald Hall.
 John Ruffle.
 Adolph Ulrich, Ph.D. (Heid.).

General Notices.

Examinations.—Examinations for the Associateship and Fellowship will be held at the Institute in April, 1921.

Candidates who desire to be examined in April should notify the Registrar.

Notice to Associates.—Associates elected prior to January 1918, who can produce evidence satisfactory to the Council that they have been continuously engaged in the study and practical applications of chemistry for at least three years since their election to the Associateship, can obtain particulars of the Regulations and forms of application for the Fellowship.

Appointments Register.—A Register of Fellows and Associates and Registered Students of the Institute of Chemistry who are available for appointments is kept at the Offices of the Institute. For full information, inquiries should be addressed to the Registrar.

Fellows and Associates are invited to communicate with the Registrar in any instance in which they are able to assist in securing appointments for qualified chemists.

Any Registered Student in the last term of his college course who desires to make preliminary arrangements with a view to obtaining an appointment may receive the Appointments Register of the Institute on the same terms as Fellows and Associates, provided that his application for this privilege be endorsed by his Professor.

A number of Registered Students of the Institute desirous of gaining practical experience will be glad to have opportunities of working in private laboratories or works during vacations.

The Library.—The Library is open for the use of Fellows Associates and Registered Students, between the hours of 10 A.M. and 6 P.M. on week-days (Saturdays: 10 A.M. and 2 P.M.) except when examinations are being held.

The Library of the Chemical Society is also available for the use of Fellows and Associates of the Institute wishing to consult or borrow books, from 10 A.M. to 9 P.M. on week-days: (Saturdays from 10 A.M. to 5 P.M.)

Changes of Address.—In view of the expense involved through frequent alterations of addressograph plates, etc., Fellows, Associates, and Students notifying changes of address are requested, to give, as far as possible, their *permanent* addresses for registration.

Register of Laboratory Assistants.—The Institute maintains a Register of Chemical Assistants who have passed approved Preliminary Examinations, and in some cases Intermediate Science Examinations. These youths are capable of doing useful laboratory work and are seeking positions at a living wage, while preparing by evening classes for their degrees and the Associateship of the Institute.

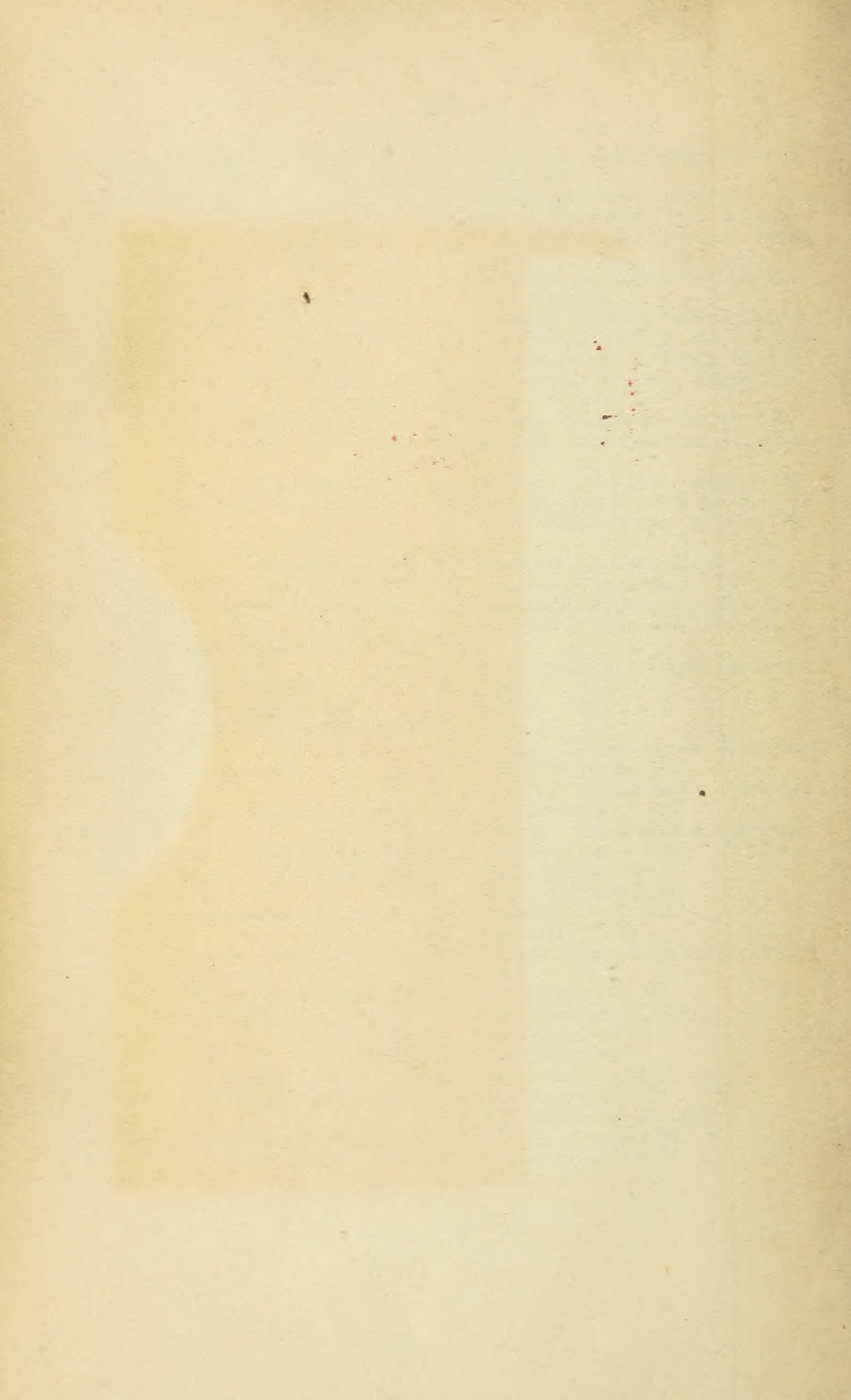
Fellows and Associates who from time to time have vacancies to offer such Chemical Assistants are asked, in the first instance, to communicate with the Registrar; they will thus assist in establishing on a definite footing a register of Chemical Assistants, who should in all cases be encouraged to become students of the Institute with a prospect of qualifying for the Associateship and Fellowship.

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